
# Solutions for Press Safety

SIMATIC S7-F/P

Unrestricted | © Siemens 2021 | Metal Forming | August 2021

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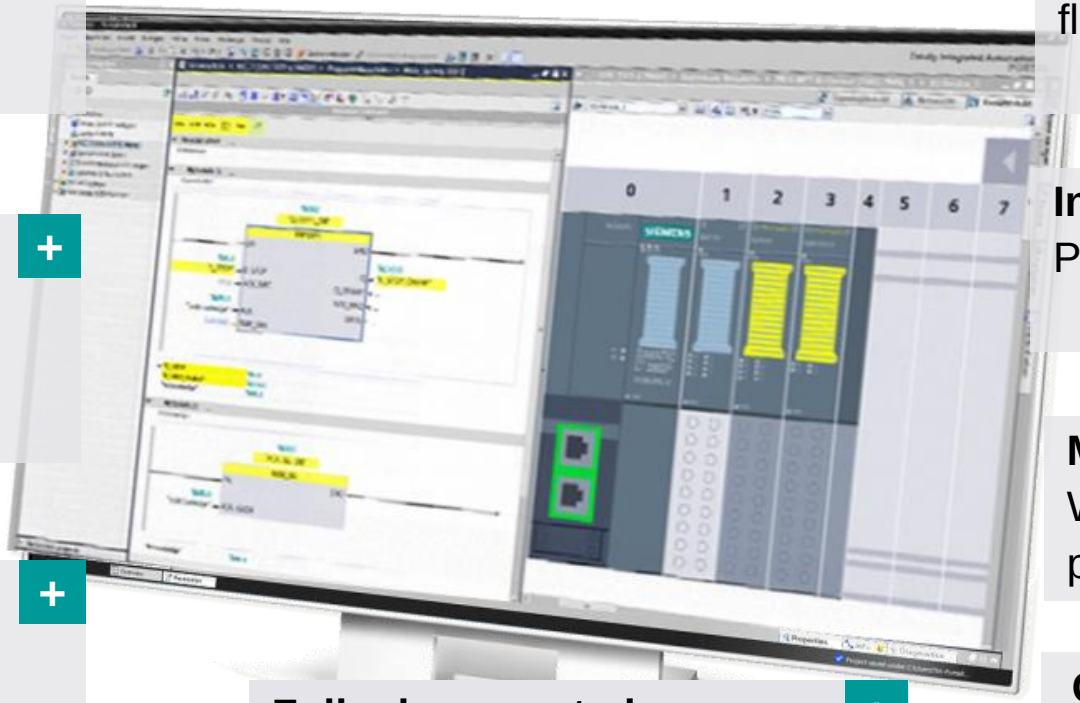
# SIMATIC S7-F/P
# Features and benefits

**Reduced engineering time**
Through field-proven and modular function blocks

**Reduced period acceptance test and validation**
Due to certificate of German BG

**Software based failsafe**
flexible und certified



**Full scalability**
Across all SIMATIC Failsafe Controllers
(Basic – Advanced - SW-Controller)

**Installation-routine**
Plug-and-Play into TIA Portal

**Full benefits of**
Safety-related features
CRC Checksum, Know-How-Protection, light test, wire-break,…

**Modular concept**
With multi-instance programming

**Fully documented**
Manual + complete, executable example projects

**Online-help**
Activate directly from TIA Portal (SHIFT+F1)



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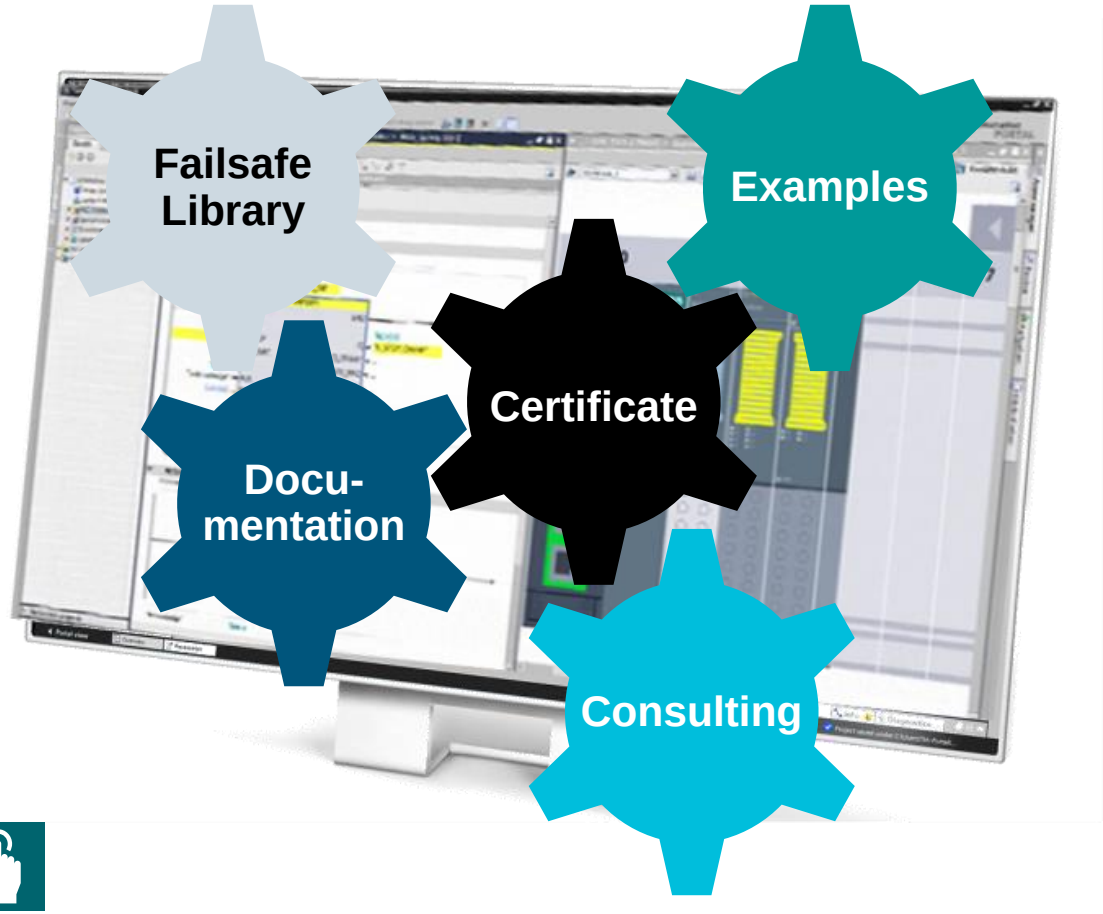
# SIMATIC S7-F/P
# Failsafe library for the press shop




**Failsafe library** consists of more than 40 failsafe, know-how protected function blocks +

**Executable solution examples**
Functional solutions for mechanical-, hydraulic- and servopresses +

**Documentation and Online Help**
of all function blocks and solution examples +

**Consulting**
by Siemens safety experts via application support +

**Certified**
by German BG following actual international standards +

**Failsafe function blocks for implementation of all press safety functions, expert consulting and certification by German BG**



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# SIMATIC S7-F/P
# New standards ISO 16092

**DIN EN 692**
Machine tools - Mechanical presses – Safety

**DIN EN 693**
Machine tools – Safety – Hydraulic presses

**DIN EN 13736**
Safety of machine tools – Pneumatic presses

## ISO 16092
## Machine tools safety – Presses –

- Part 1: General safety requirements
- Part 2: Safety requirements for mechanical presses
  - Group 1: Conventional mechanical presses
  - Group 2: Servo presses
- Part 3: Safety requirements for hydraulic presses
- Part 4: Safety requirements for pneumatical presses

**Easier implementation of safety functions in press shops with appropriated C-standard for all press technologies – incl. Servo presses**



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# SIMATIC S7-F/P
# Following all terms and standards

## General standards

**EN ISO 13849-1** +
- Up to PLe and Kat.4

**DIN EN 62061** +
- Up to SIL3

**EN IEC 61508-3** +
- Up to SIL3

**2006/42/EG** +
- According Machinery Directive

**GS-HSM-30** +
- Principles of testing…

certificate
no. **HSM 21011**
dated 2021-03-17

DGUV Test
Prüf- und Zertifizierungsstelle
Hebezeuge, Sicherheitskomponenten und Maschinen
Fachbereich Holz und Metall

Translation In any case, the German original shall prevail.

**Type Test Certificate**

| | |
|---|---|
| Name and address of the holder of the certificate (customer): | Siemens AG<br>Frauenauracher Str. 80<br>91056 Erlangen<br>GERMANY |
| Product designation: | **Press safety library** |
| Type: | • S7-F/P TIA for S7-300F, S7-400F, IM151F IM154F, WinAC RTX (F)<br>• S7-F/P TIA for S7-1200F, S7-1500 |
| Testing based on: | See Annex |
| Test Report: | No. 2020-038 dated 17.03.2021 |
| Further details: | Intended use: The failsafe SIMATIC S7-F/P library contains programmed, complete function blocks which can be called, parameterized and interconnected with each other within the user programme of the SIMATIC Safety System.<br><br>Compliance with the listed and/or applicable standards presupposes use of the failsafe SIMATIC Safety system in acc. with SIL 3 of IEC 61508- 1 to -3 and IEC 62061, and with PL e, cat. 4 of ISO 13849- 1 (TÜV Certificate no. Z10 16 02 67803 010), a correct interconnection and integration of the function blocks listed in cl. 5 into the user programme.<br><br>Remarks: See Annex<br><br>Follow-up certificate of HSM 16031 dated 27.10.2016. |

The type tested complies with the provisions laid down in the directive 2006/42/EC **(Machinery)**.
The present certificate is valid until: **2024-03-16**
The type test certificate is not entitled to use a test mark.
Further provisions concerning the validity, the extension of the validity and other conditions are laid down in the Rules of Procedure of Testing and Certification.

Dipl.-Ing. Jan Stegmann
Head of testing and certification body

PZB10E 11.14

Deutsche Gesetzliche Unfallversicherung (DGUV) e. V.
Spitzenverband der gewerblichen Berufsgenossenschaften und der Unfallversicherungsträger der öffentlichen Hand
Vereinsregister-Nr. VR 751 B, Amtsgericht Charlottenburg

DGUV Test Prüf- und Zertifizierungsstelle Hebezeuge, Sicherheitskomponenten und Maschinen • Fachbereich Holz und Metall
Aradiastraße 8 • 40472 Düsseldorf • Deutschland
Telefon: +49 (0) 6131 802-1690 • Fax: +49 (0) 6131 802-2690

## Specific standards

**ISO 16092-1** +
“Part 1 General safety requirements”

**ISO 16092-2** +
„Part 2 Safety requirements for mechanical presses “

**ISO 16092-3** +
„Part 3 Safety requirements for hydraulic presses “

**ISO 16092-4** +
„Part 4 Safety requirements for pneumatic presses “

**DIN EN 12622** +
“Safety of machine tools – Pneumatic presses”



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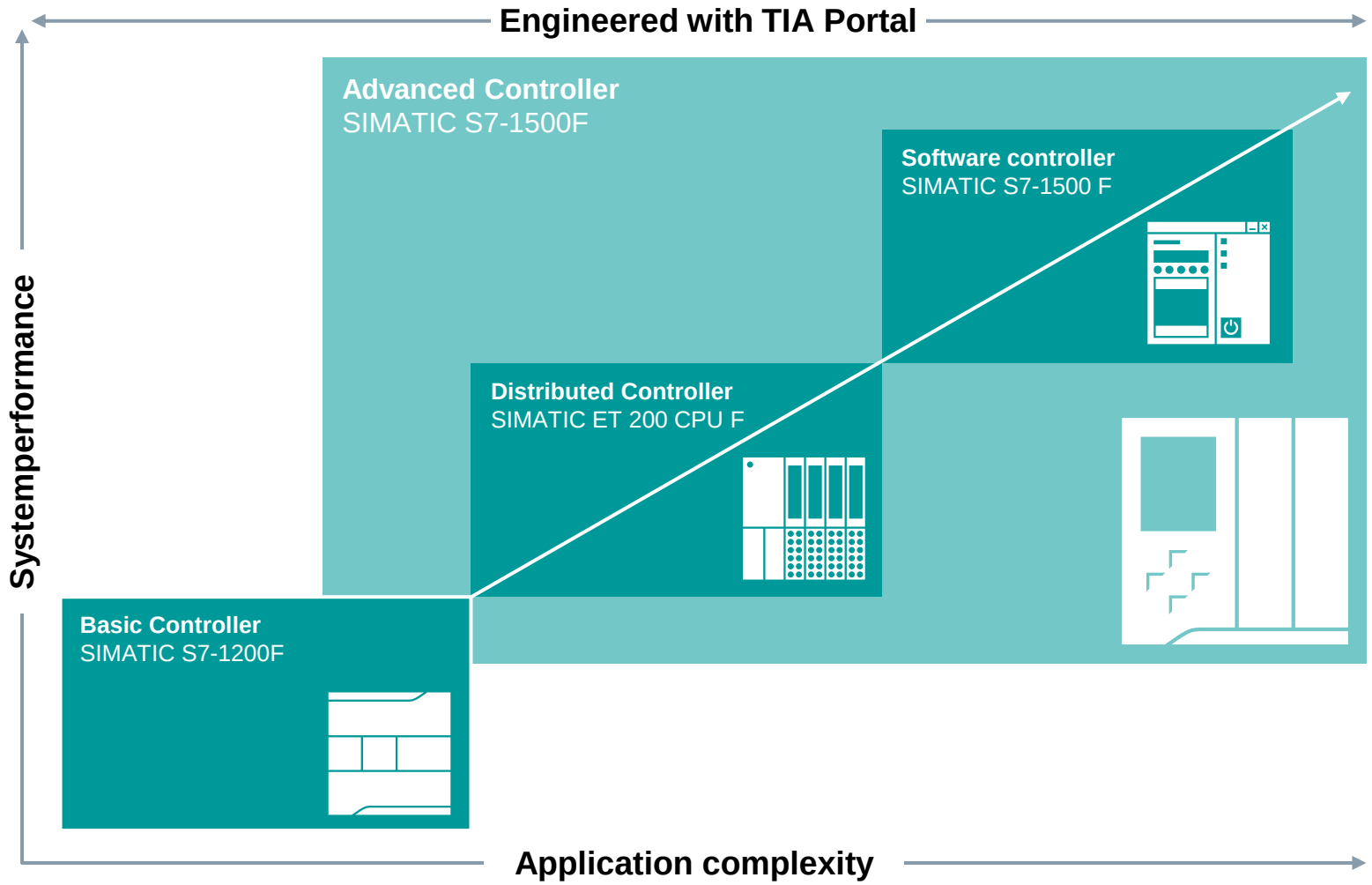
# SIMATIC S7-F/P –
# Full scalability across all SIMATIC F-Controller




| | |
|---|---|
| Functionality | + + + |
| Reaction time | + + + |
| Program code | + + + |
| Functionality | + + + |
| Reaction time | + + |
| Program code | + + |
| Functionality | + + + |
| Reaction time | + + |
| Program code | + |



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# SIMATIC S7-F/P
# the right solution for all applications

## Results and suggestions

| | Mechanical press<br>CPU 1215F<br>SM1226 F-DI and F-DQ  | Mechanical press<br>CPU 1512P F<br>ET200SP F-DI and F-DQ  | Mechanical press<br>CPU 1516F<br>ET200MP F-DI and F-DQ  |
|---|---|---|---|
| Clamp-Clamp reaction time | + + | + + | + + + |
| Program code | + | + + | + + + |
| Reaction time F-Module | + + | + | + + + |
| Price | + + + | + + | + |

S7-1200F, the cheap alternative for all stand-alone safety functions– without any functional restrictions to S7-1500F

Distributed Failsafe Controller for all flexible press applications in mid-range press area – additional space for standard automation tasks

High performant S7-1500F for easy integration and combination of standard and failsafe functionality – full scalability with distributed IO´s



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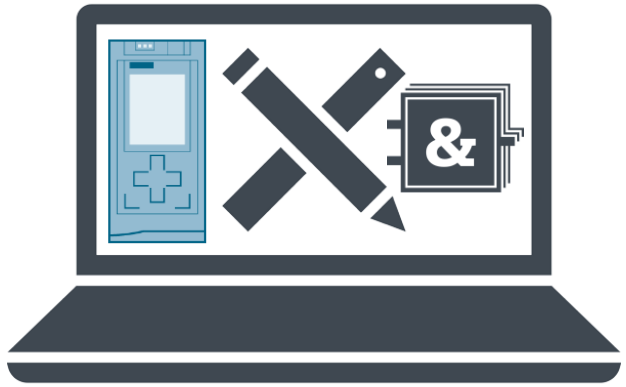
# SIMATIC S7-F/P
# Be ready for virtual commisioning

## Real Hardware

**Engineering**

**Since TIA Portal V15**
**+ Press safety library V15.0.1**

## SIMATIC S7-PLCSIM



- No simulation specific changes in user program necessary any more
- PLC Sim for all failsafe Controllers
- Safety + Standard + Motion Control can be simulated



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# SIMATIC S7-F/P
# Select your First license

You want to use all advantages of Press Safety Library for the first time…
…a **First License** is your choice.
Included: certified Function block library, three certified example projects, Manual, Online help,…

**Which Engineering System do you use?**

**SIMATIC Manager?**

(S7-Distributed Safety)
**V2.0 First license**
**6AU1837-0EA10-0DX1**

**TIA Portal?**

(STEP 7 Safety Advanced
/ STEP 7 Safety Basic)

**Which SIMATIC F-Controller do you use?**

**Just S7-1200F??**

**Basic First license**
**6AU1837-0EA10-0GX3**

**All SIMATIC F-Controller?**

**Advanced First license**
**6AU1837-0EA10-0GX1**



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# SIMATIC S7-F/P
# Select your Upgrade- and Machine licenses

You are already Press Safety Library user in S7-Distributed Safety…

## …and you implement another machine

**V2.0 Machine license**
**6AU1837-0EA10-0DX2**

Paper license as certificate for the proven use of function blocks for this machine

## …and start now with TIA Portal

**Advanced Upgrade License**
**6AU1837-0EA10-0EX1**

Identically content like Advanced First license (Full functionality, all F-Controllers, complete documentation,…)

You are already Press Safety Library user in TIA Portal…

## …and you implement another machine

**Basic/Advanced Maschinenlizenz**
**6AU1837-0EA10-0GX2**

Papierlizenz als Zertifikat für den Einsatz der Bausteine für diese Maschine

## …and S7-1200F is not enough, you want to use all F-Controller

**Basic Upgrade License**
**6AU1837-0EA10-0EX2**

Identically content like Advanced First license (Full functionality, all F-Controllers, complete documentation,…)



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# SIMATIC S7-F/P
# License overview

| | Description | Material | |
|---|---|---|---|
| SIMATIC S7-F/P V1.2 (Distributed Safety) | Maschine license | 6AU1837 0EA10 0AX2 |  |
| SIMATIC S7-F/P V2.0.X (Distributed Safety) | First license | 6AU1837 0EA10 0DX1 |  |
| | Maschine license | 6AU1837 0EA10 0DX2 |  |
| SIMATIC S7-F/P (TIA Portal) | Upgrade license (Advanced) | 6AU1837 0EA10 0EX1 |  |
| | Basic - First license | 6AU1837 0EA10 0GX3 |  |
| | Advanced - First license | 6AU1837 0EA10 0GX1 |  |
| | Maschine license (Basic/Advanced) | 6AU1837 0EA10 0GX2 |  |
| | Upgrade license (Basic) | 6AU1837 0EA10 0EX2 |  |

Library, Application, Manual, Certificate, Online help

Paper license for each F-PLC



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# SIMATIC S7-F/P
# List of blocks (part 1)

## Operation mode selector

„MODE_SEL“ Operation mode selector 1 out of n → up to 8 modes

„MODE_SWI“ Operation mode selection via button

„MODE_2_6“ Operation mode selector 2 out of 6 → up to 15 modes

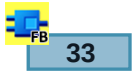
## Emergency off

„EM_OFF“ Monitoring of Emergency off devices without restart inhibit

„EM_OFF_Q“ Monitoring of Emergency off devices with restart inhibit

## Safety doors

„DOOR_LCK“ Safety door with locking



„DOOR_1CH“ Safety door with or without manual acknowledgement



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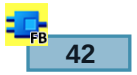
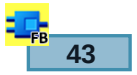
# SIMATIC S7-F/P
# List of blocks (part 2)

## Two-hand consoles

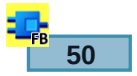



„2H_PL“ Operation and monitoring of a pluggable two-hand console



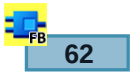

„2H_EN“ Operation and monitoring of a two-hand console

## 2 out of 2 evaluation

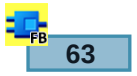



„SEN2V2“ Evaluation of anti- and  equivalent 2-channel sensors

## Foot switches



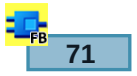

„FOOT_EN“ Evaluation of antivalent, 2-channel foot switches




„FOOT_PL“ Evaluation of antivalent, 2-channel foot switches (pluggable)

## Light curtain


„LCU_CLCK“ Operation of a light curtain in safety and clock mode




„LCU_SAFE“ Operation of a light curtain in safety and clock mode



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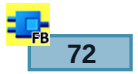
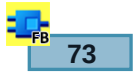
# SIMATIC S7-F/P
# List of blocks (part 3)

## Brake damping

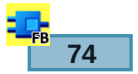



„DAMP“ Damping the brake on mechanical presses

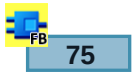
## Speed and encoder monitoring




„ENC_MON” Block to implement shaft breakage and encoder connection monitoring when using a PROFIsafe

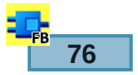



„SP_MON” Monitoring a mechanical cam switch gear (proximity switch and toothed gear)
– with counter module



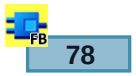

„SP_MO_DI“ Monitoring a mechanical cam switch gear (proximity switch and toothed gear)
– with digital input module

## Valve monitoring




„DYN_VALV“ Dynamic control of up to 4 valves

## Quadruple AND




„AND4“ Quadruple AND link with restart inhibit and error variable



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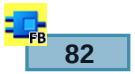
# SIMATIC S7-F/P
# List of blocks (part 4)

## Fault handling



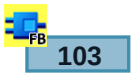

„F_SUM_3“ Classification in error categories and acknowledgement

## Enable blocks


„EN_1_MAN“ Enable for single-operator function


„EN_4_MAN“ Enable for multi-operator function

## Output cam blocks




„SW_CAMVP“ Block to implement a software cam switchgear in the “pendulum“ mode with variable end points


„SW_CAM“ Block to implement a software cam switchgear with overtravel monitoring


„SW_CAM_P“ Block to implement a software cam switchgear in the “pendulum” mode



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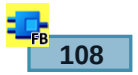
# SIMATIC S7-F/P
# List of blocks (part 5)

## TDC switch off


„UDC_OVL“ Dynamic TDC switch-off and de-energizing the safety valves in the event of ram overload

## Cam monitoring / TDC stop




„CAM_MON“ Monitoring of the mechanical cam switchgear the dynamic TDC switch-off and of the overtravel


„CAM_STOP“ Monitoring the dynamic TDC stop and the static TDC stop

## Valve control


„VALVE_ME“ Energizing the press safety valves on mechanical presses (clutch/brake combination)


„VALVE_HY“ Energizing the press safety and directional valves on hydraulic presses



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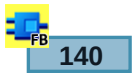
# SIMATIC S7-F/P
# List of blocks (part 6)

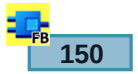
## Valve and relay monitoring


„VA_CHECK” Component for monitoring valves / relays


„CARTR“ Switching time for cartridge valves on de-energizing

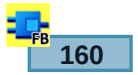



„CONTACT“ Energizing 1 or 2 actuators (contactor/valve) and monitoring (feedback circuit)




„„STAT_CMD“ Energizing and static monitoring of valves/contactors

## Overtravel monitoring




„OVERTR“ Monitoring of the overtravel of linear presses

## Enabling buttons


„EN_SW1“ Three-stage enabling button for two contacts


„EN_SW2“ Three-stage enabling button for two NC contacts and one auxiliary contact



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# SIMATIC S7-F/P
# List of blocks (part 7)

## Blocks for servopresses


„BRK_TEST“ Block to conduct a brake test for a servo press


„EN_SERVO“ Safe setting-up operation and single-stroke operation of a servo press



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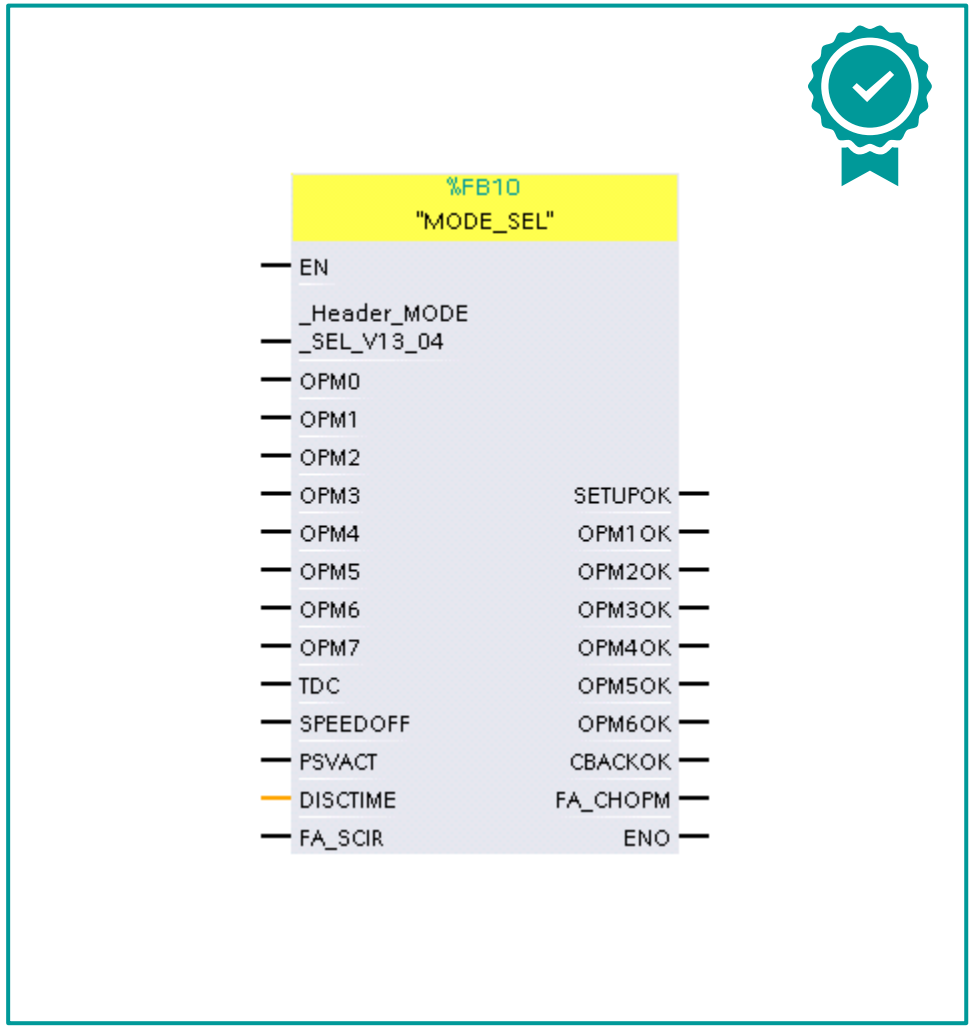
# Function blocks of the library SIMATIC S7-F/P
# FB10 „MODE_SEL“

## Selecting operation mode

- One channel operation mode switch
- 8 operation modes configurable
- Multi selection and cross circuit is recognized
- Time for multi selection is configurable



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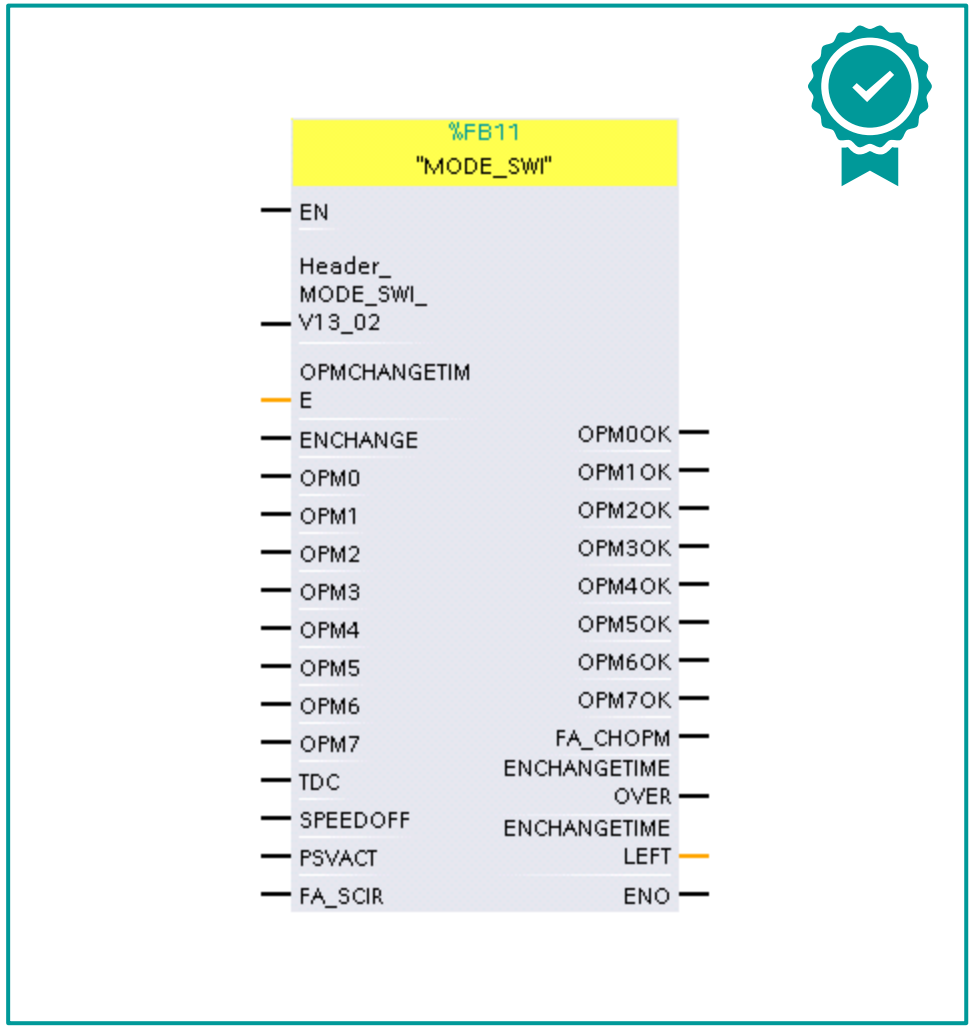
# Function blocks of the library SIMATIC S7-F/P
# FB11 „MODE_SWI“

## Selecting operation mode

- One channel operation mode buttons
- 8 operation modes configurable
- Multi selection and cross circuit is recognized
- Time for multi selection is configurable
- Enable changing with switch



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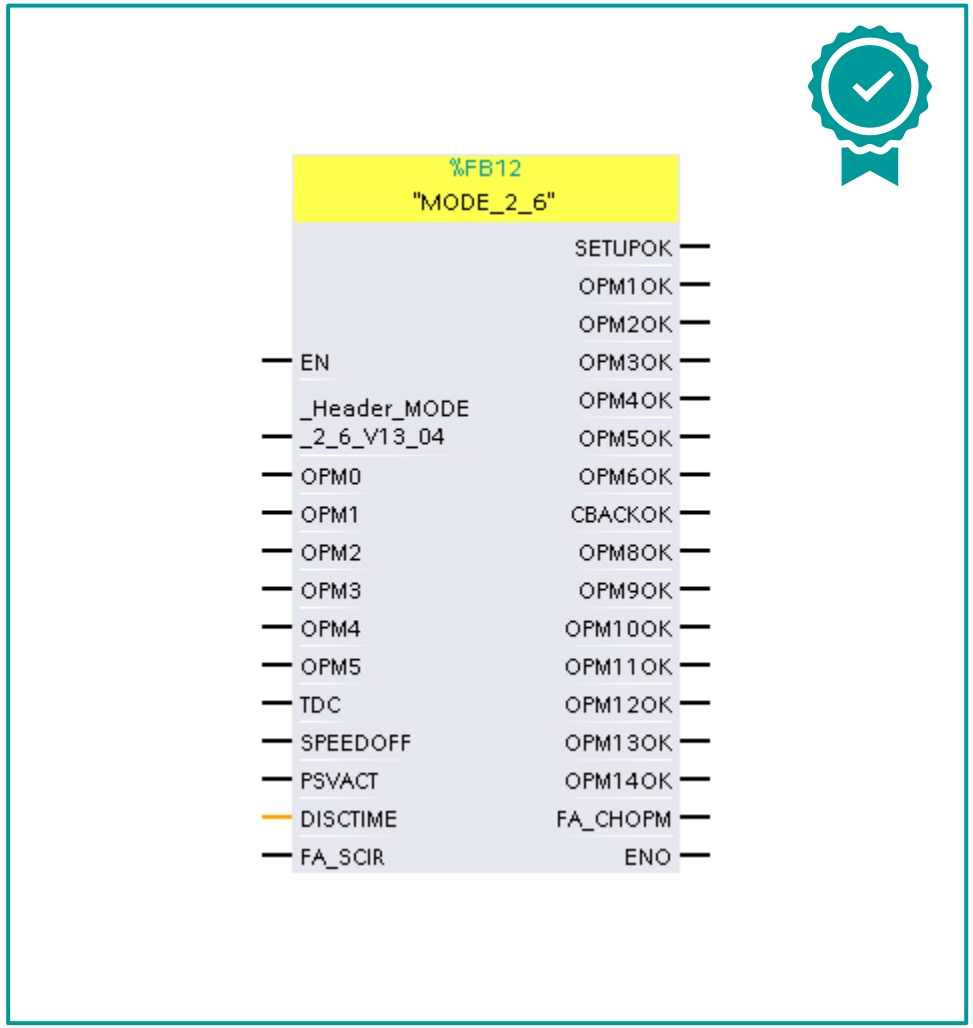
# Function blocks of the library SIMATIC S7-F/P
# FB12 „MODE_2_6“

## Selecting operation mode

- Up to 6 inputs are pluggable
- Activation unequal 0 or 2 is been detected
  - ➢ wire breakage or cross circuit
- One or none from 15 signal combinations must be active
- Tolerance time of a false activation is configurable



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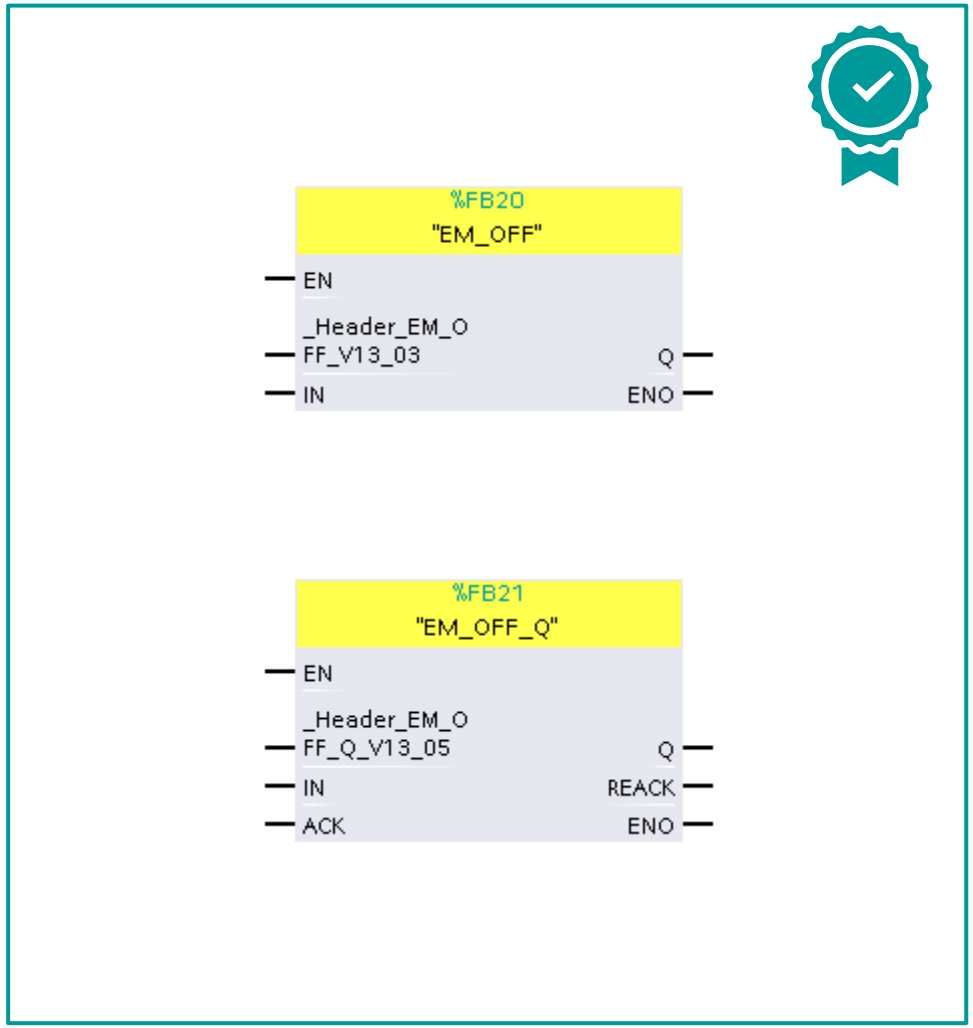
# Function blocks of the library SIMATIC S7-F/P
# FB20 „EM_OFF“ und FB21 „EM_OFF_Q“

## Emergency stop with and without restart inhibit

- 2 channel equivalent evaluation
- 2 of 2 evaluation in the F-HW module
- Indicate the acknowledgement request



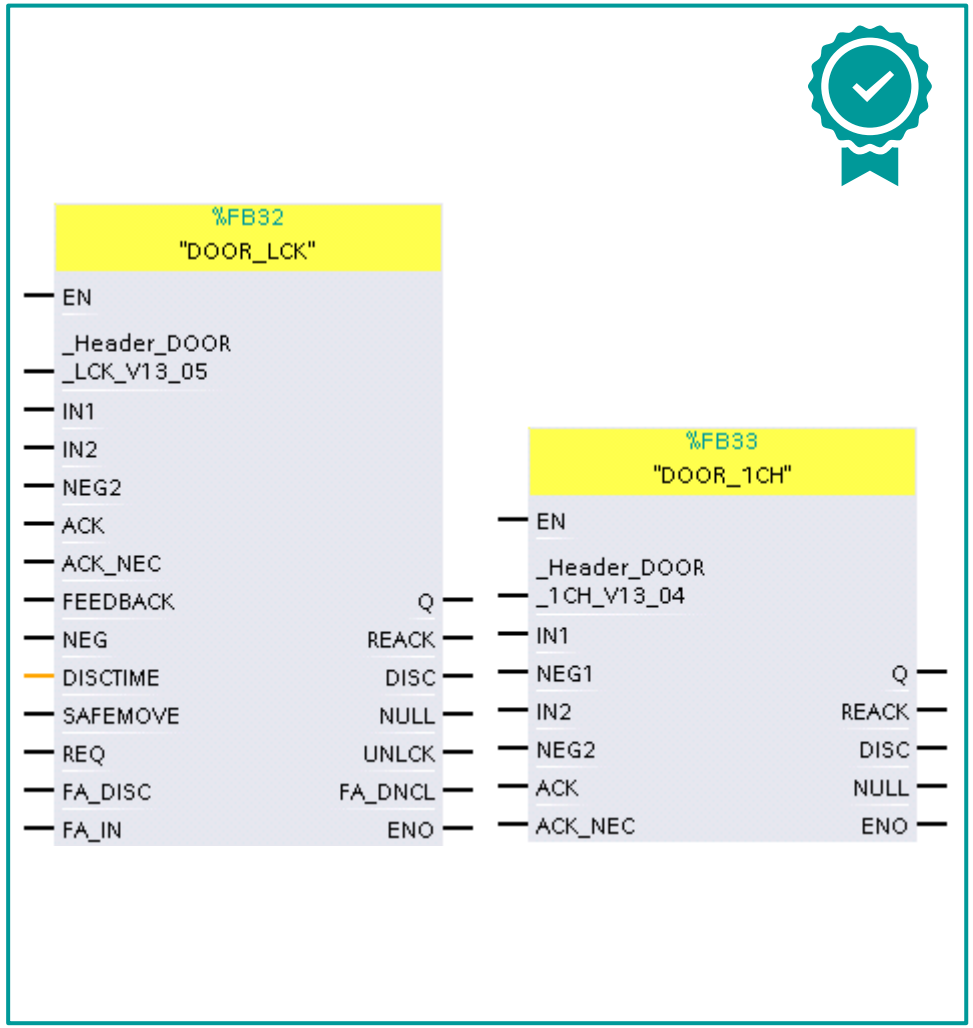



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB32 „DOOR_LCK“ und FB33 „DOOR_1CH“

## Monitoring of a safety door

- Read in 2 channels
- Equivalent and non-equivalent evaluation of the sensors possible
- With or without manual acknowledgement possible
- DOOR_LCK: Function block activates locking function and monitors this actuation






SIEMENS

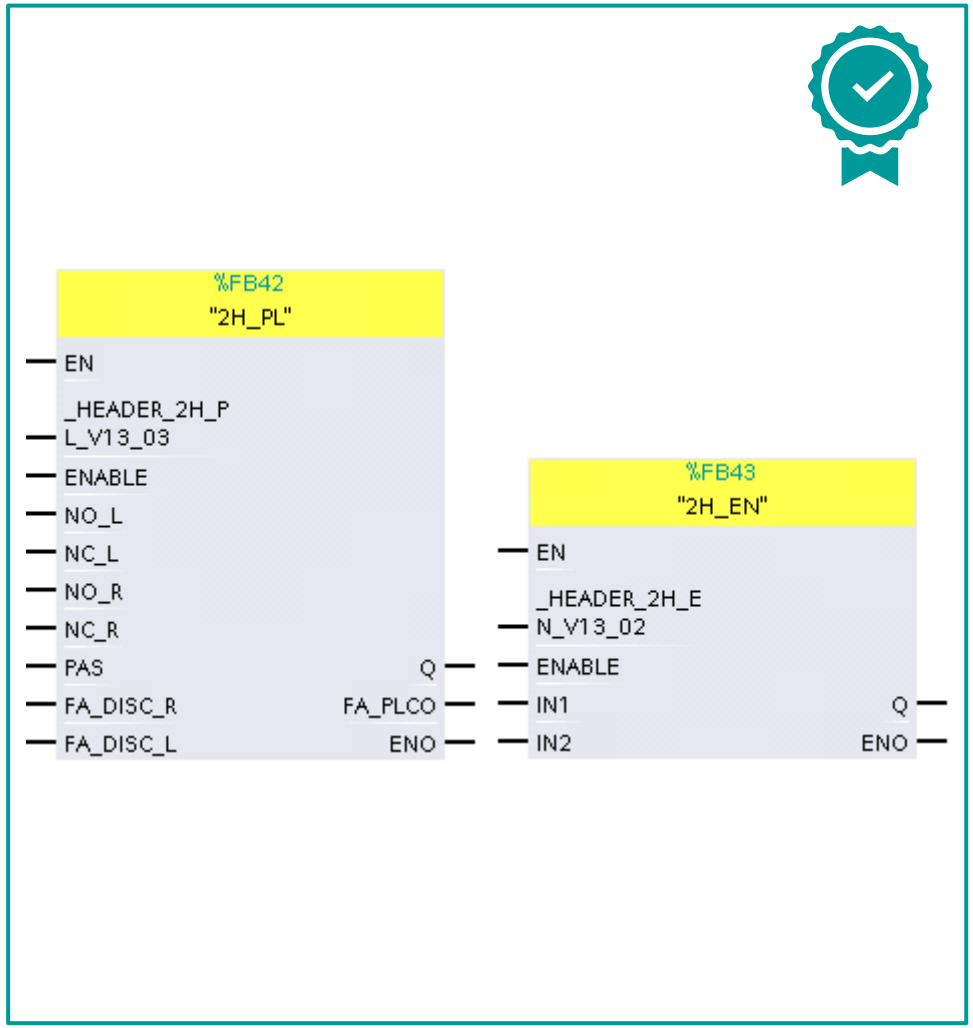
# Function blocks of the library SIMATIC S7-F/P
# FB42 „2H_PL“ und FB43 „2H_EN“

## Two-hand consoles

- For 2 NC contact / NO contact combinations
- Monitoring of discrepancy time and correct actuation
- wire breakage and cross circuit detection

**2H_PL**

- For plug-in 2-hand consoles
- Plug control
- Possibility of wiring the contacts to different modules/ assembly



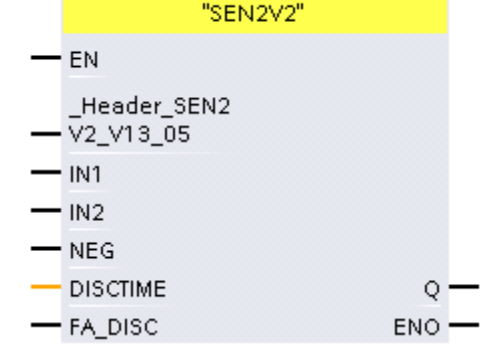



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB50 „SEN2V2“

## Evaluate two-channel sensors

- Parameterization equivalent or non-equivalent possible
- Evaluation of discrepancy with software possible
- Possibility of wiring the contacts to different modules/ assembly



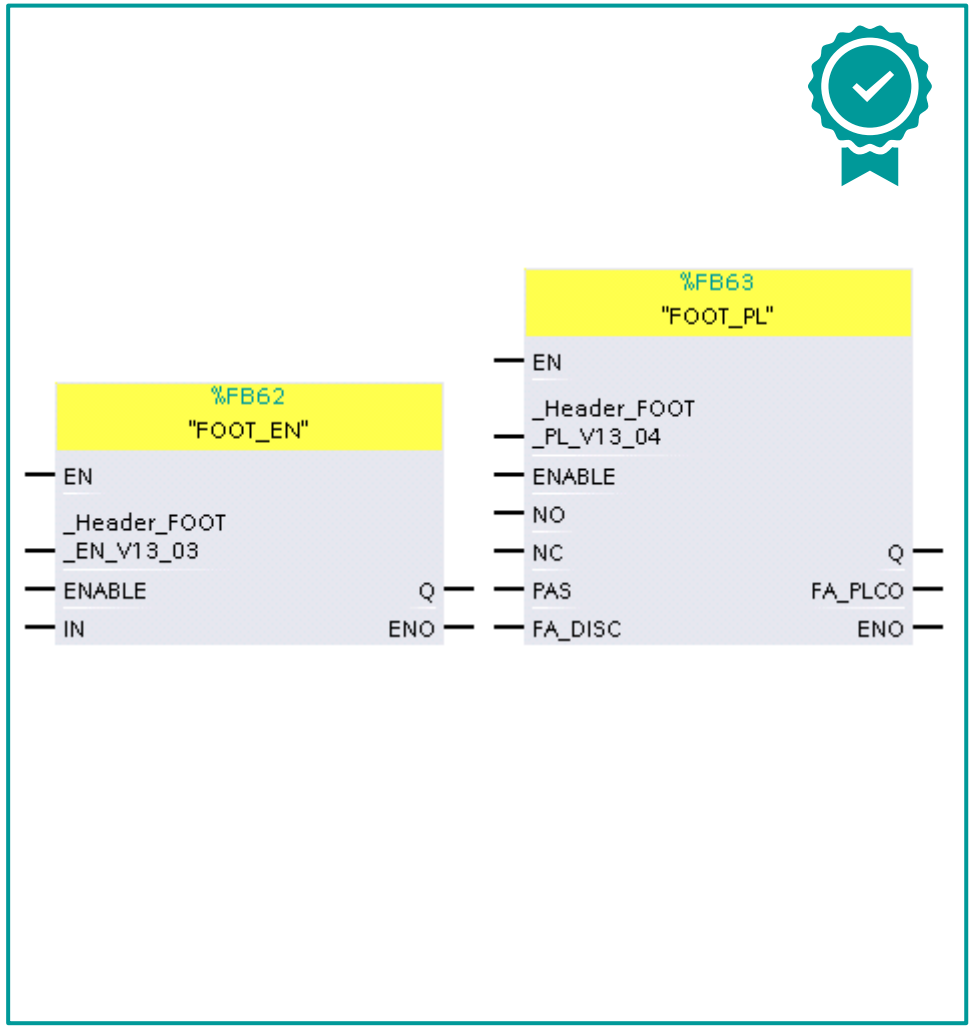



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB62 „FOOT_EN“ und FB63 “FOOT_PL“

## Foot switches and pluggable foot switches

- FOOT_EN: Realization of the 2 out of 2 evaluation in the safety Hardware
- FOOT_PL: Plug control and contact control with the NO and NC contacts
  - ➢ No additive contact necessary






SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB70 „LCU_CLCK“ und FB71 „LCU_SAFE“

## Operation and supervision safety light curtain

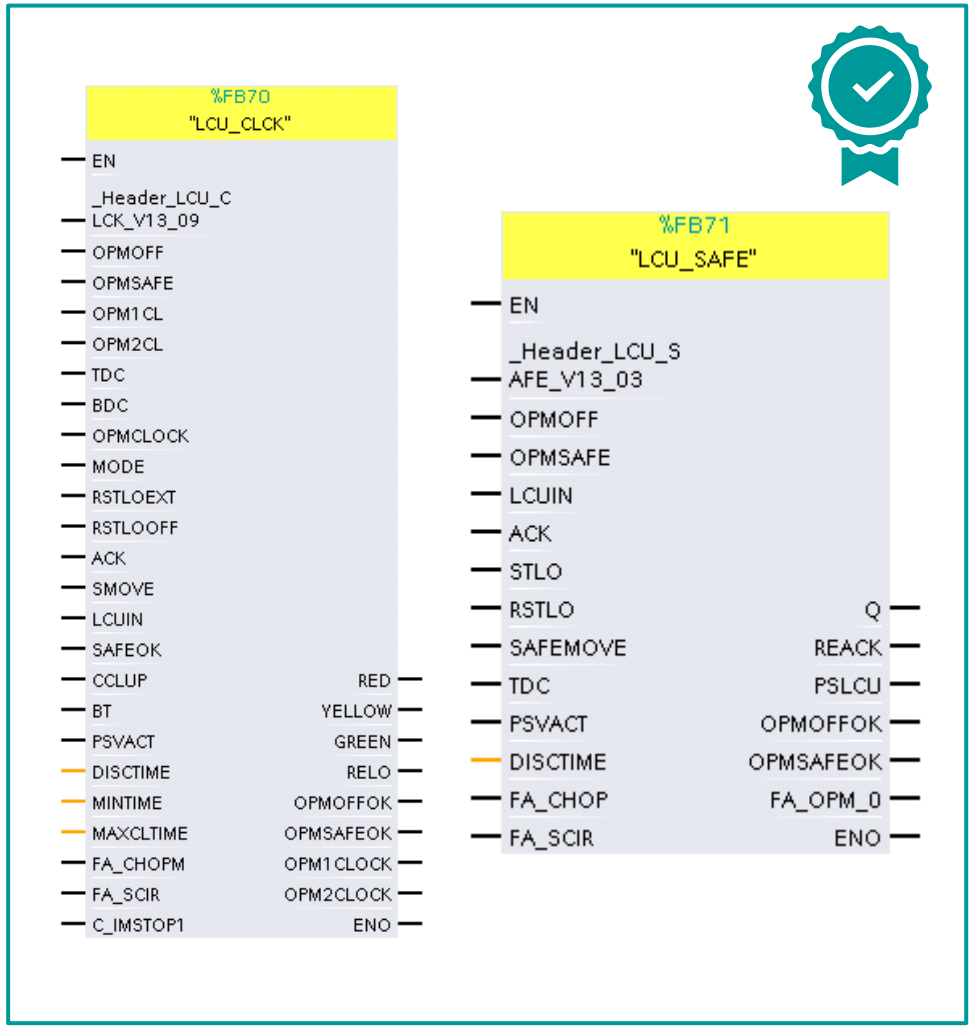
- Detection of multi selection and cross circuit at the operation mode switch

**LCU_CLCK:**

- safety and clock mode possible
- Indicates the state of the light curtain
- Clock mode in standard mode and sweden mode
- Muting signal

**LCU_SAFE:**

- Only for safety mode



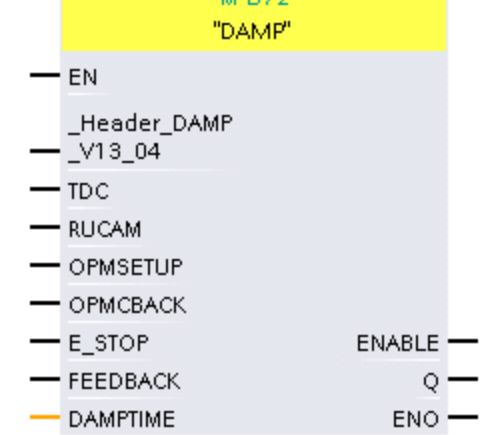



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB72 „DAMP“

## Brake damping on mechanical presses

- Inactive at certain conditions e.g. certain operating modes only at single stroke or at EM-OFF activity (configurable)



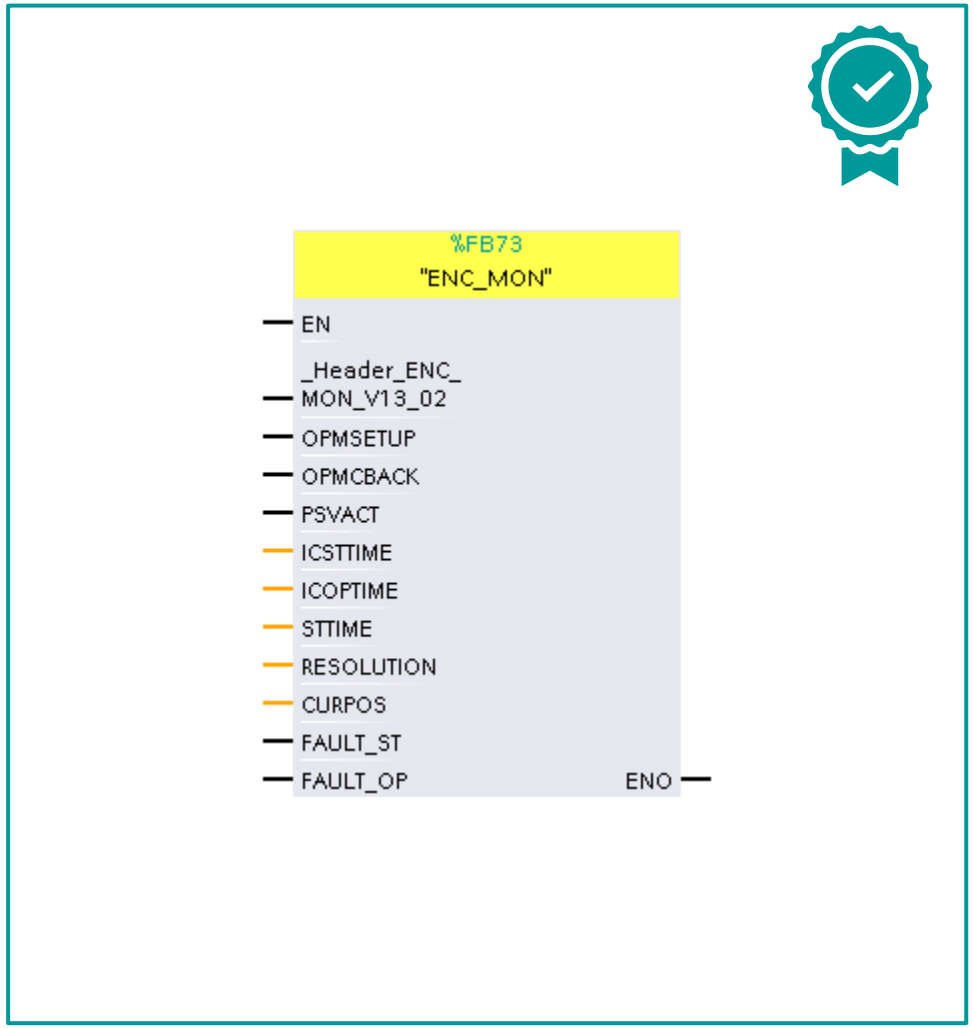



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB73 „ENC_MON“

## Shaft breakage and encoder connection monitoring

- Use of a PROFIsafe-encoder instead of a mechanical cam switchgear
- Monitoring position change of the encoder while press safety valves are energized
- Startup period and operation period configurable



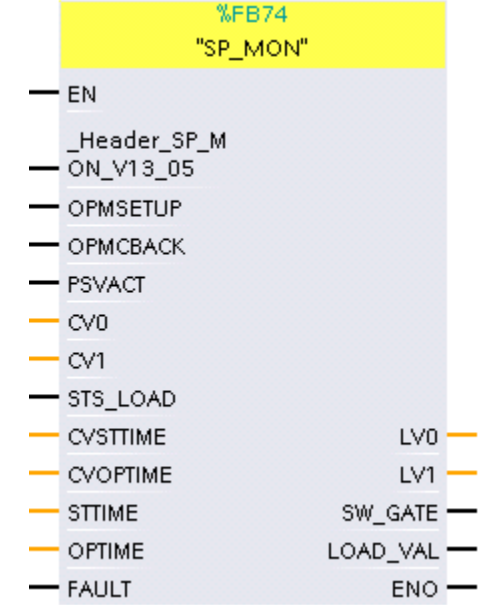



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB74 „SP_MON“

## Monitoring of a mechanical cam switchgear (speed monitor)

- Encoder (toothed gear with inductive proximity switch) necessary
- Evaluation of a defect at the shaft or the cam switch-gear
- Start up phase and operating phase
- Passivation (e.g. at setting up)
- Detection with counter module (1 Count 24V/100kHz)



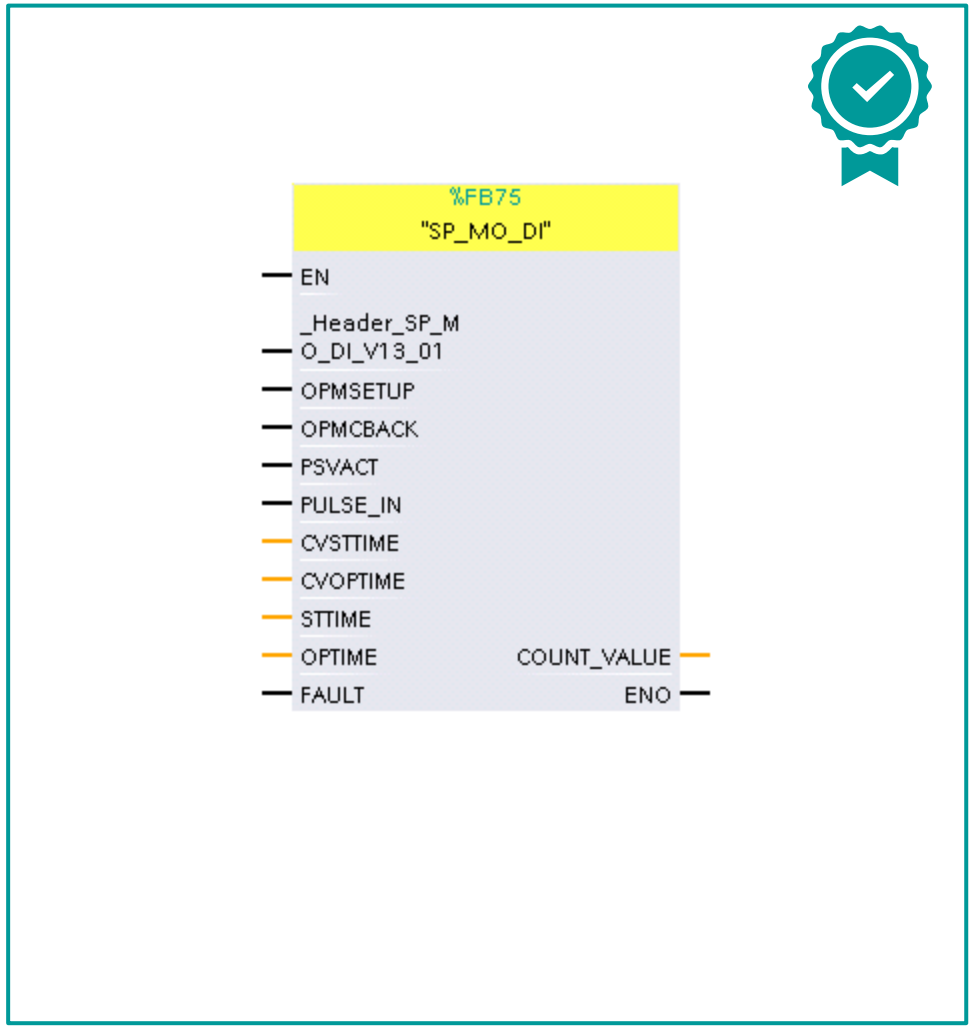



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB75 „SP_MO_DI“

## Monitoring of a mechanical cam switchgear (speed monitor)

- Counting the impulses of a pulsing device
  (e.g. 30 impulses per pressing stroke)
- Monitoring the pulsing device/the mechanical cam switchgear on minimum pulses at energized press safety valves
- Startup period and operation period parameterizable
- Pulse recording via safe digital input
- No counter module required
- Only for “slow” presses applicable
  - ➢ otherwise use „SP_MON“



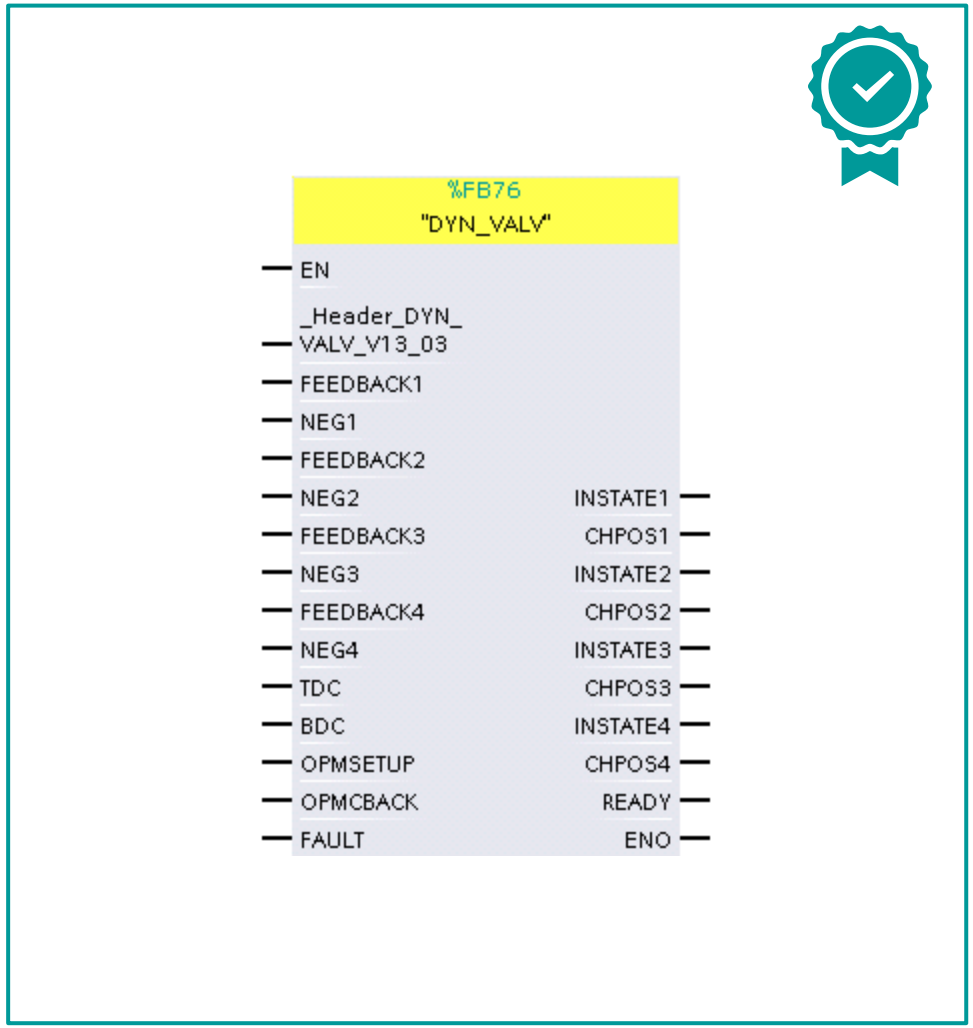



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB76 „DYN_VALVE“

## Dynamic monitoring of up to 4 valves

- Monitoring of position change during a full stroke
- Start only in base position
- Passivation e.g. at certain operating modes



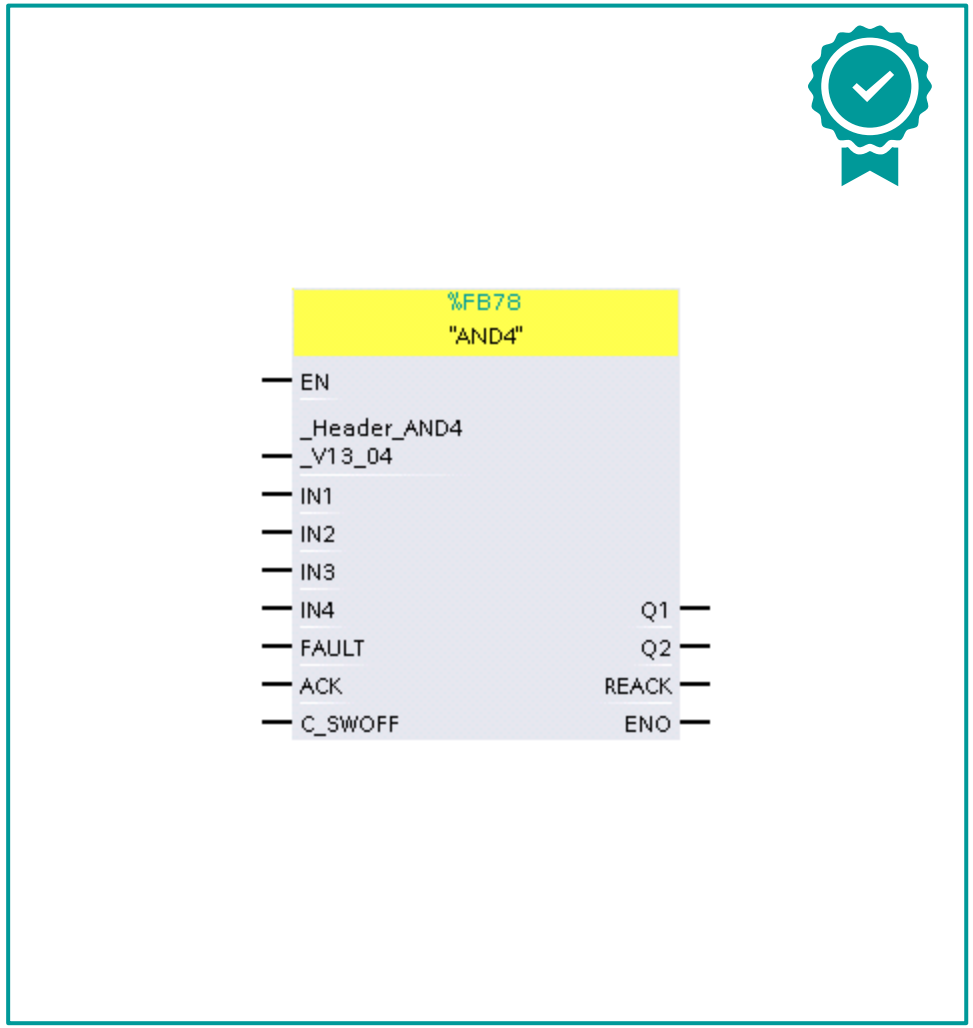



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB78 „AND4“

## 4-signals AND link and with one Error variable (negated)

- Manually acknowledgement for restart necessary
- Possible Application: Enable of  safety zones or of a load voltage



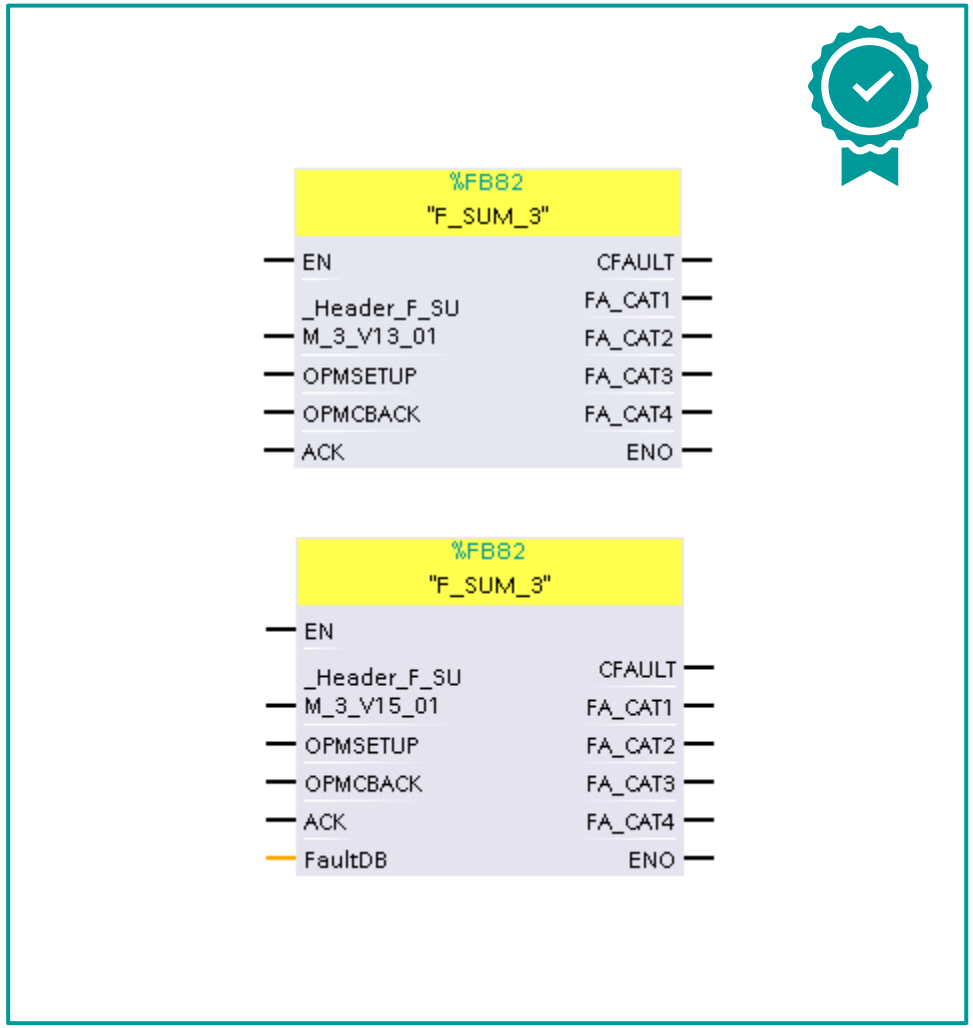



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB82 „F_SUM_3“

## Error handling

- Function blocks for management of errors
- Triggering of a collective error
- Classification of the errors in categories:
  - 1: automatic reset
  - 2: Acknowledge in operating mode set up or control backwards
  - 3: Acknowledge in every operating mode
  - 4: Reset by restart of the control system
- error variables are set in a data block
  - S7-300F: F_SUM_3 → DB5
- access via F-UDT to freely chosen DB



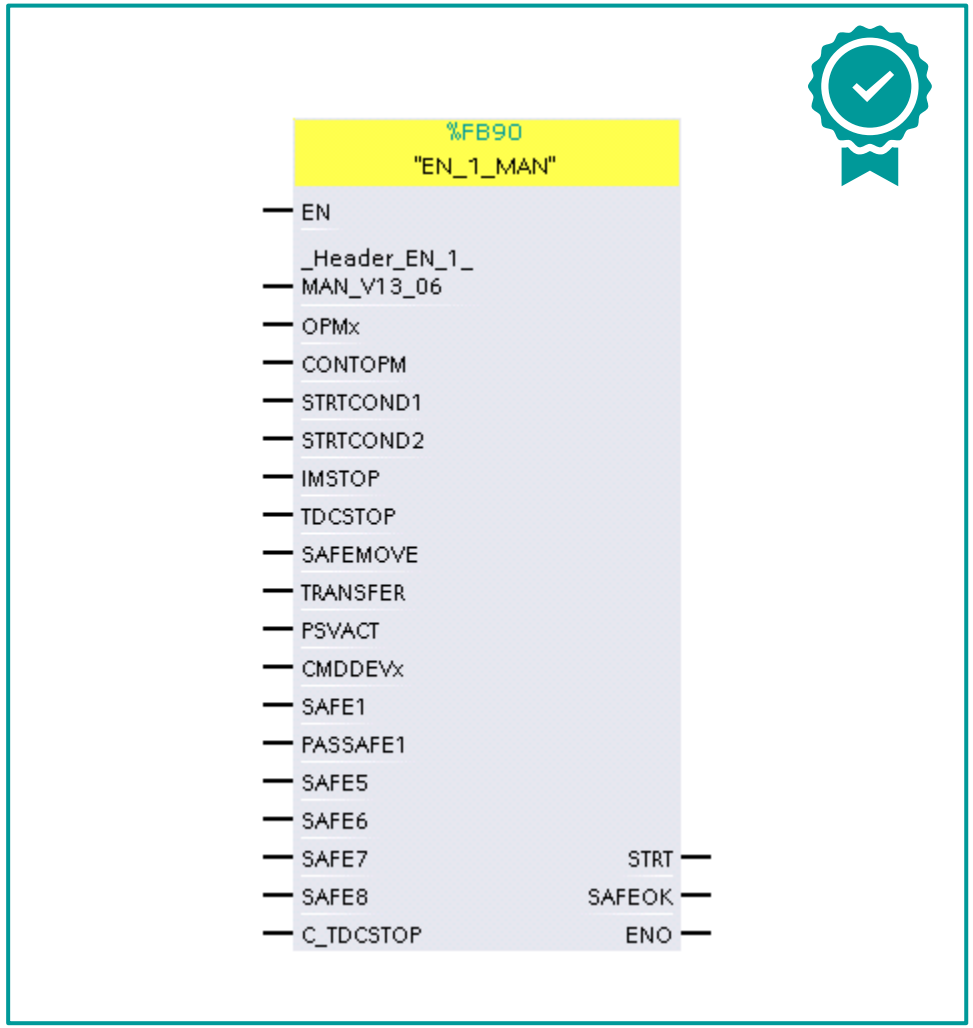



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB90 „EN_1_MAN“

## Enable of single operator function

- Starting the press with only one command device
- One safety device can be bypassed, 4 safety devices can’t be bypassed
- Generates the  start signal from the state of the command device and safety devices
- Transfers the start signal to the block which energizes the valves
- Evaluation of a safe movement (SAFEMOVE)






SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB100 „EN_4_MAN“

## Enable of multi-operator function

- Handling of the press with up to 4 command devices
- 4 safety devices can be bypassed and 4 safety devices can’t be bypassed
- Generates start signal from the state of the command devices and safety devices
- Transfers the start signal to the block which energizes the valves
- Evaluation of a safe movement (SAFEMOVE)




SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB103 „SW_CAMVP“

## Software cam switchgear in “pendulum” mode

- Designed for servopresses (adapted for standard applications)
- Cam generation based on actual position and direction
- Position can be received by PROFIsafe-encoder
- Position can be received by PROFIsafe telegram 901 (safety integrated function Safe Position)
- Parameterization of a hysteresis possible
- Separate signal if cams are valid
- Separate signals for identification of the press direction
- Variable pendulum end points (learnable)




SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB104 „SW_CAM“

## Software cam switchgear and overtravel control

- Cam generation based on actual position
- Position can be received by PROFIsafe-encoder
- Position can be received by PROFIsafe telegram 901 (safety integrated function Safe Position)
- Parameterization of a hysteresis possible
- Unit takes stroke height adjustment into account
- Separate signal if cams are valid
- Overtravel monitoring at TDC stop

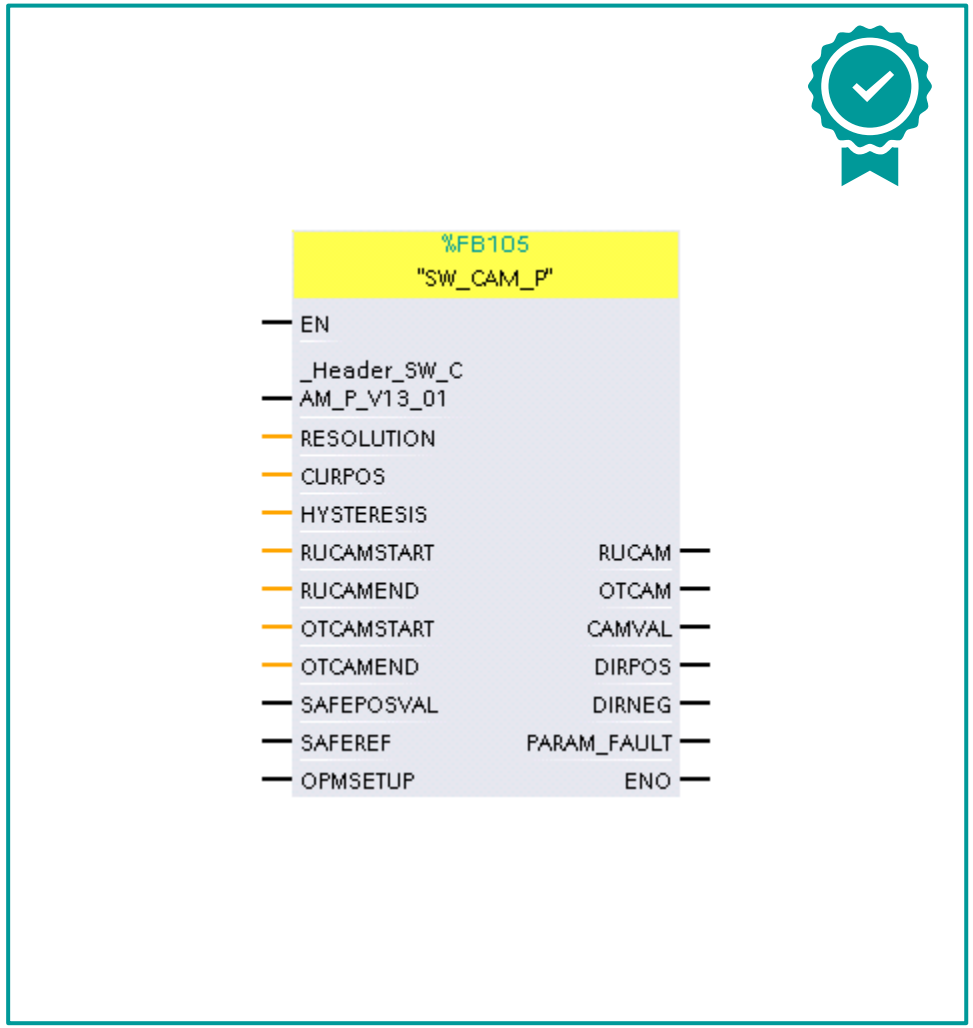



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB105 „SW_CAM_P“

## Software cam switchgear in “pendulum” mode

- Designed for servopresses (adapted for standard applications)
- Cam generation based on actual position and direction
- Position can be received by PROFIsafe-encoder
- Position can be received by PROFIsafe telegram 901 (safety integrated function Safe Position)
- Parameterization of a hysteresis possible
- Separate signal if cams are valid
- Separate signals for identification of the press direction



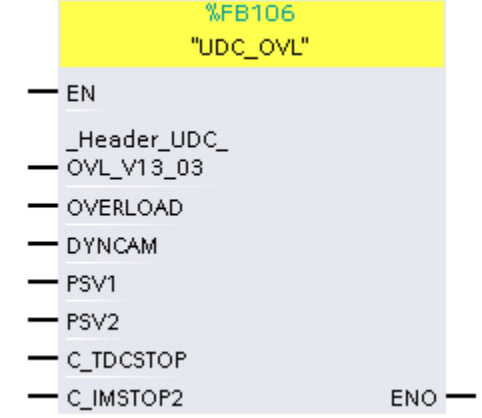



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB106 „UDC_OVL“

## De-energizing the safety valves on dynamic TDC stop or on ram overload

- Dynamic cam is not monitored
- Switch off for different stroke speed



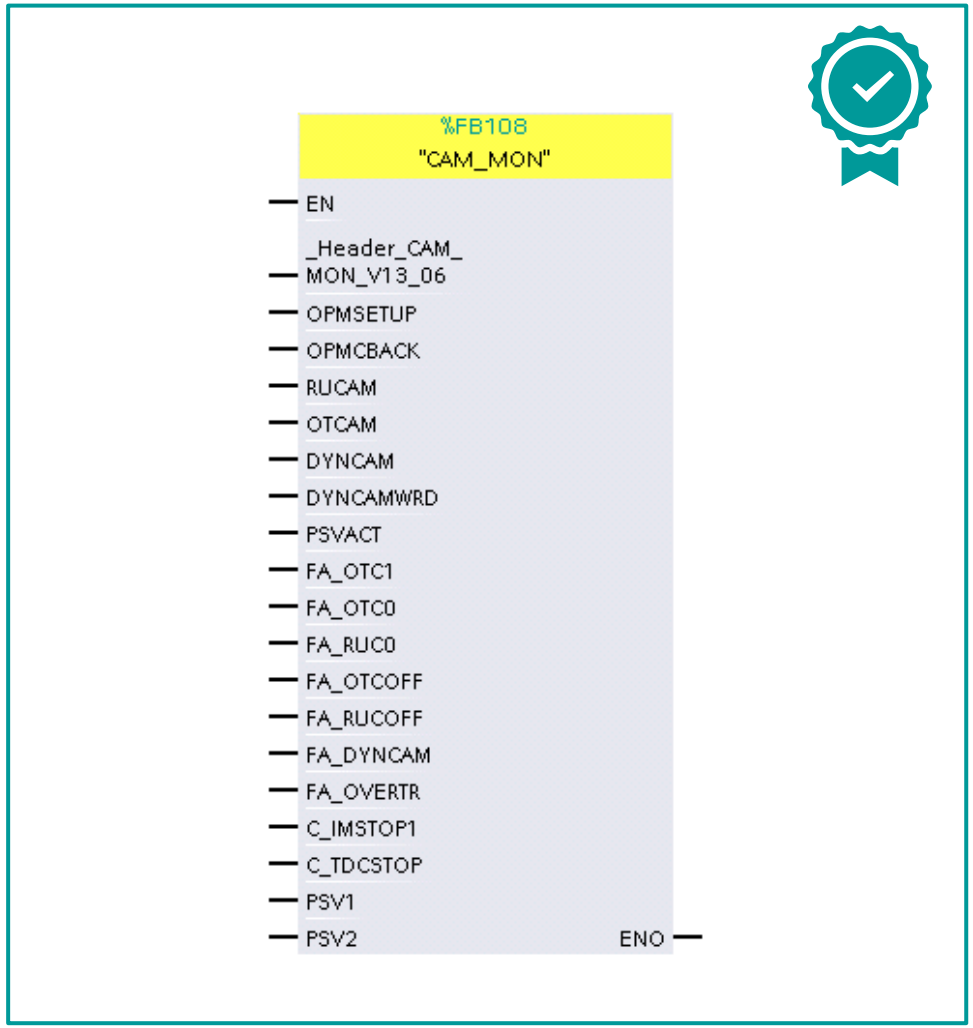



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB108 „CAM_MON“

## Monitoring the cams at a mechanical press

- Overtravel monitoring
- Monitoring of the mechanical cam switchgear, the dynamic TDC switch-off and of the over run
- TDC switch-off with rising edge of overtravel cam, if no dynamic TDC switch off
- Static `0` or `1`and loss of the cams is detected



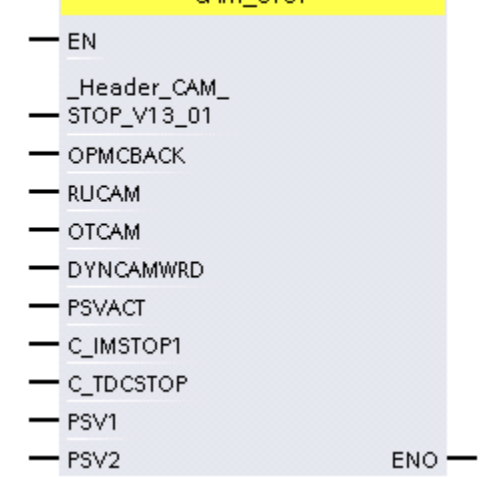



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB109 „CAM_STOP“

## Monitoring the dynamic TDC stop and the static TDC stop

- Responsible for TDC stop if a dynamic cam is not used
- Realizes the TDC stop if dynamic standard output cam was missing



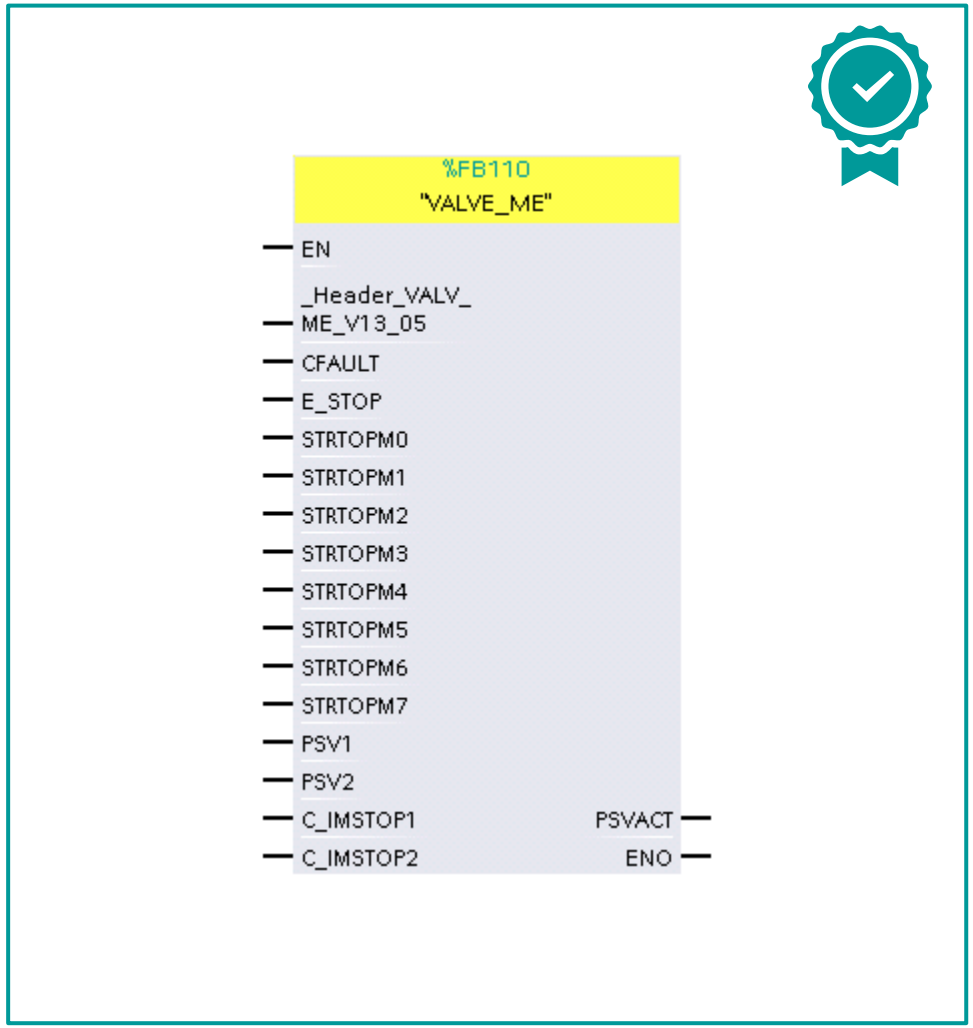



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB110 „VALVE_ME“

## Energize the press safety valves on a mechanical press

- Energizing depend on the start signal, EM-OFF signal and collective error signal
- Generating the signal to restart the overtravel monitoring






SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB112 „VALVE_HY“

## Energize the press safety valves of a hydraulic press

- Energizing of two press safety valves, DOWN valves and UP valves
- 3 groups of start up signals
  - MANUELL (2)
  - SINGLE STROKE (6)
  - CONTINUOS STROKE (2)
- Safe upward motion

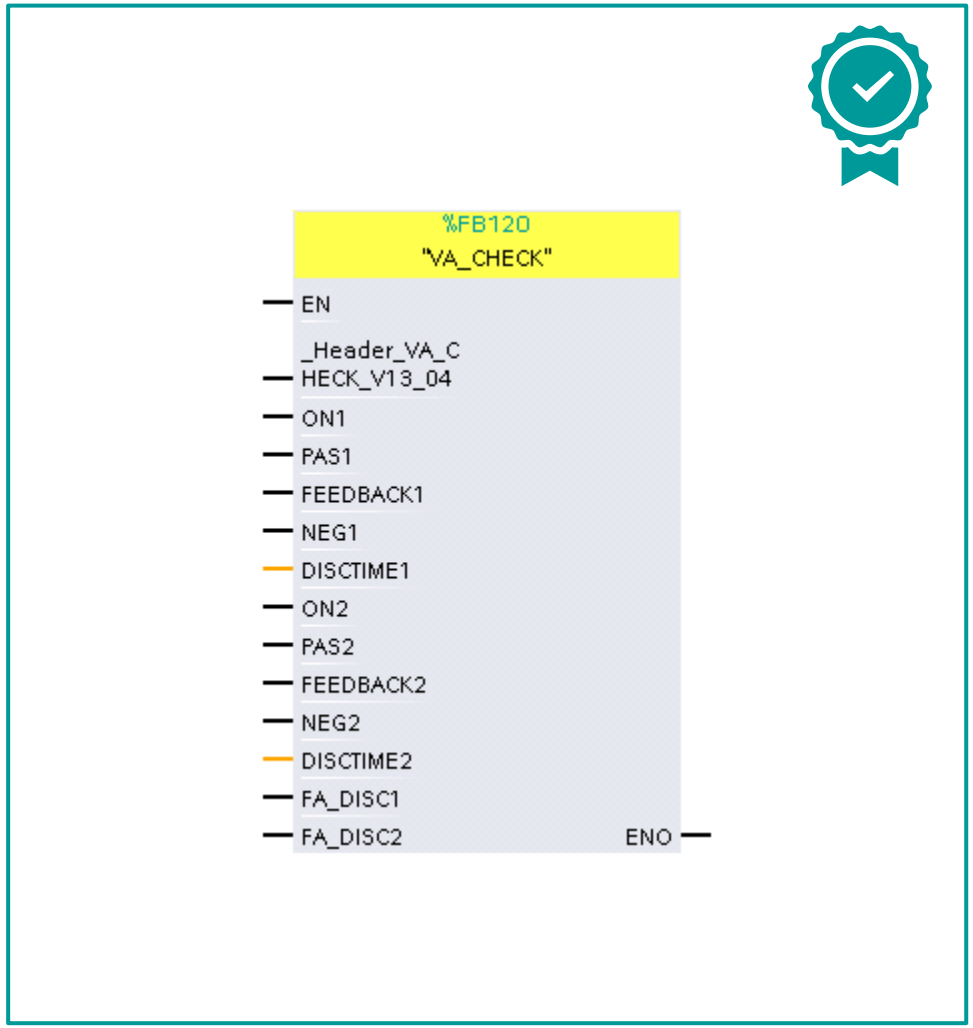



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB120 „VA_CHECK“

## Monitoring of valves/relays

- Monitoring of 2 valves / relays
- accordance of the feedback with the energizing command within a set time
- Deactivation of the monitoring is possible
- Non-equivalent or equivalent check of the feedback is parameterizable
- Message of a „false“ feedback



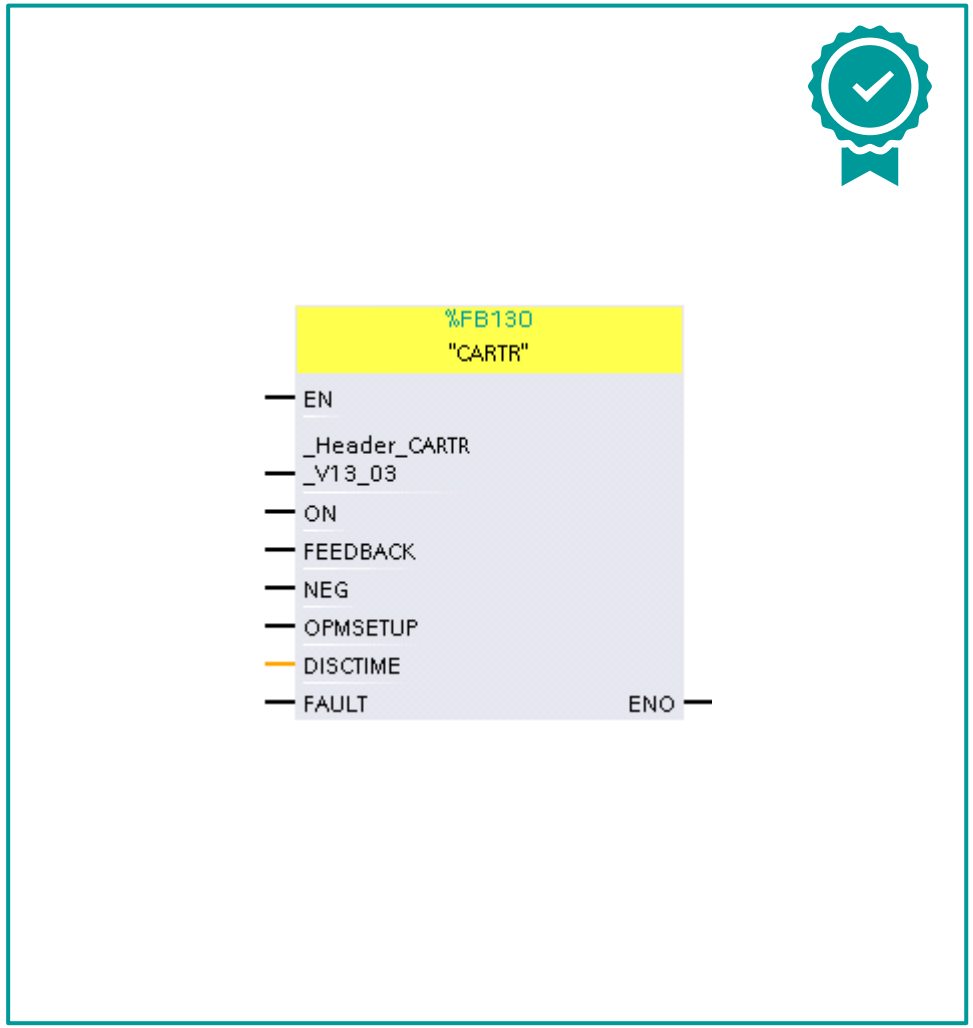



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB130 „CARTR“

## Monitoring of cartridge valves

- Monitoring only when shutting off the valves
- Non-equivalent and equivalent feedback is possible
- accordance of the feedback with the energizing command within a set time
- Deactivation of the monitoring is possible



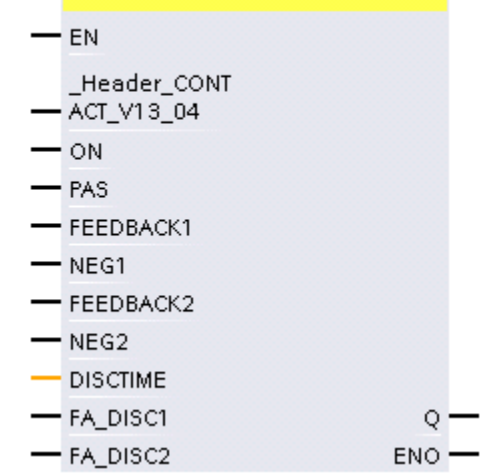



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB140 „CONTACT“

## Energizing and controlling of 2 valves/relays

- Energizing of the valve / relay combination
- accordance of the feedback with the energizing command within a set time
- Non-equivalent and equivalent feedback is possible
- Energizing only possible if the valves/ relays are in base position



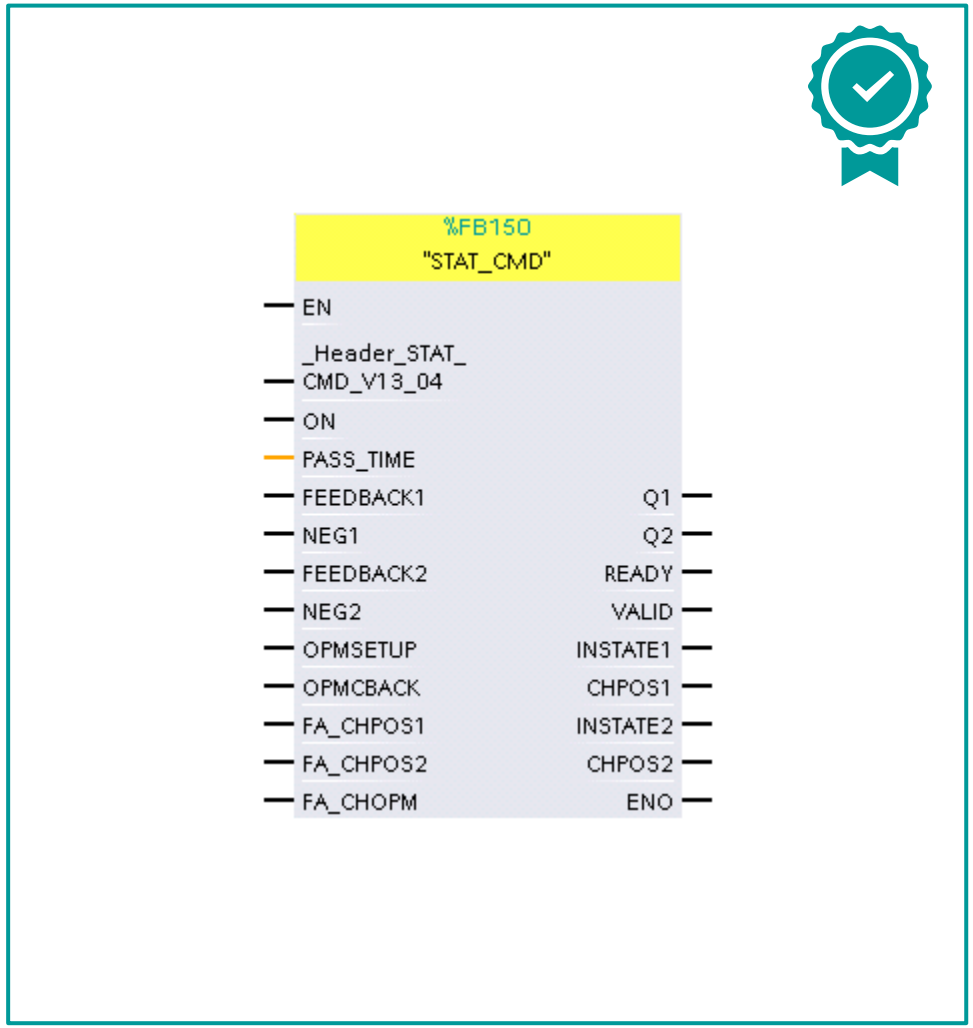



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB150 „STAT_CMD“

## Energizing and controlling of 2 valves/relays

- Energizing of the valve / relay combination
- Feedback signals monitored for signal change between activation and deactivation
- Non-equivalent and equivalent feedback is possible
- A time in which the monitoring of the feedback is passivated can be parameterized
- Energizing only possible if the valve s/ relays are in base position



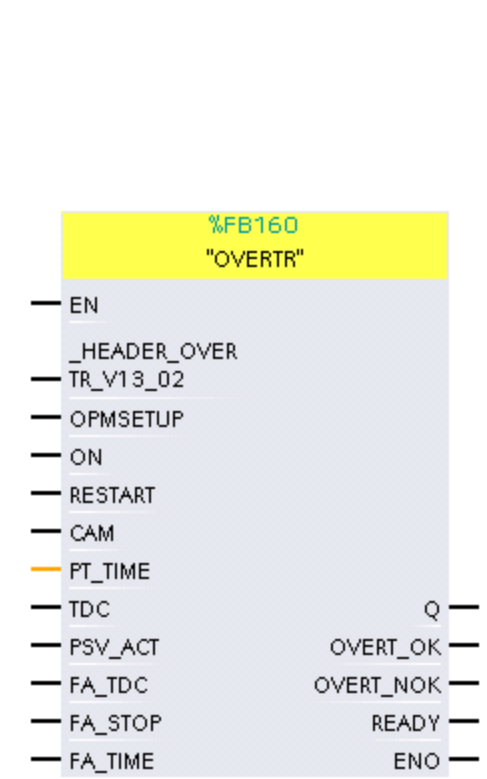



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB160 „OVERTR“

## Monitoring of overtravel at linear presses

- Deactivation of the monitoring in operation mode OPMSETUP
- Start of press only in base position
- Overtravel time parameterizable



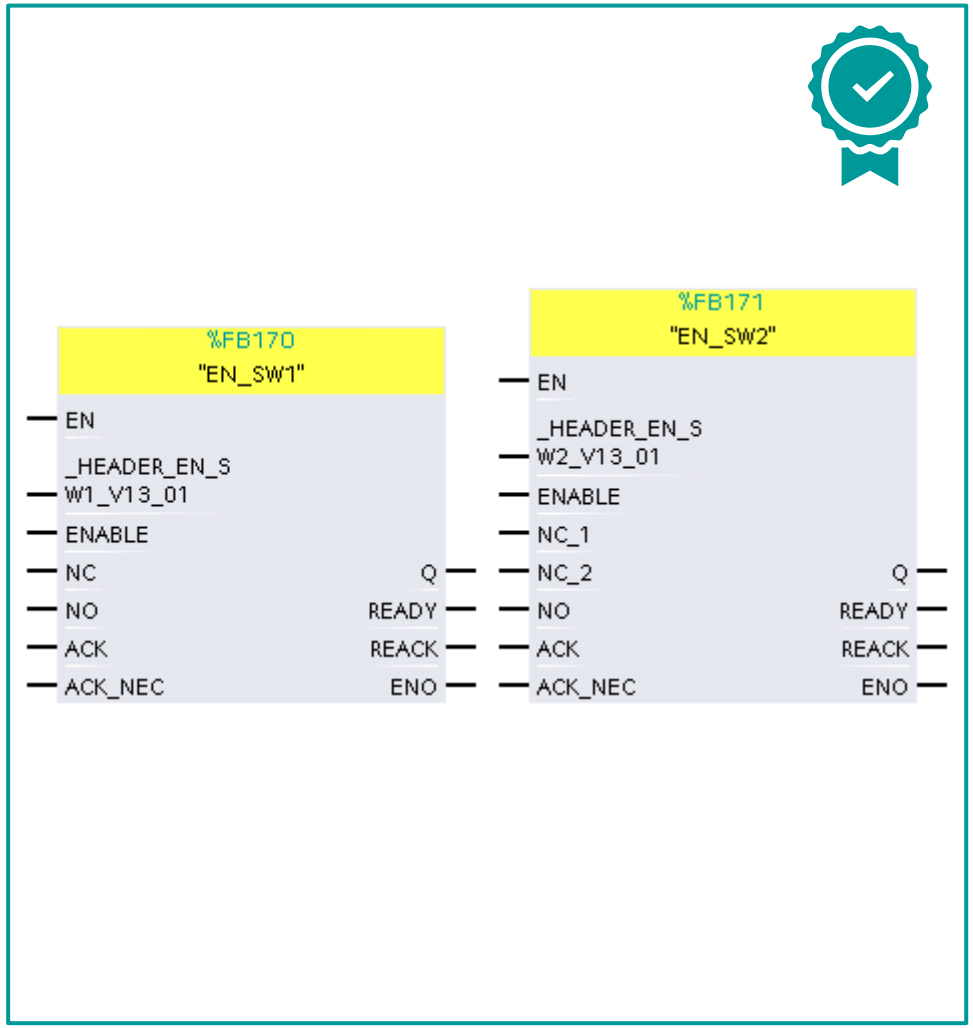



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB170 „EN_SW1“ und FB171 „EN_SW2“

## Evaluation of an “enable-switch”

- Restart inhibit parameterizable
- EN_SW1: Evaluation of the signals of a three-stage enable switch with two contacts
- EN_SW2: Evaluation of the signals of a three-stage enable switch with to contacts and an auxiliary contact



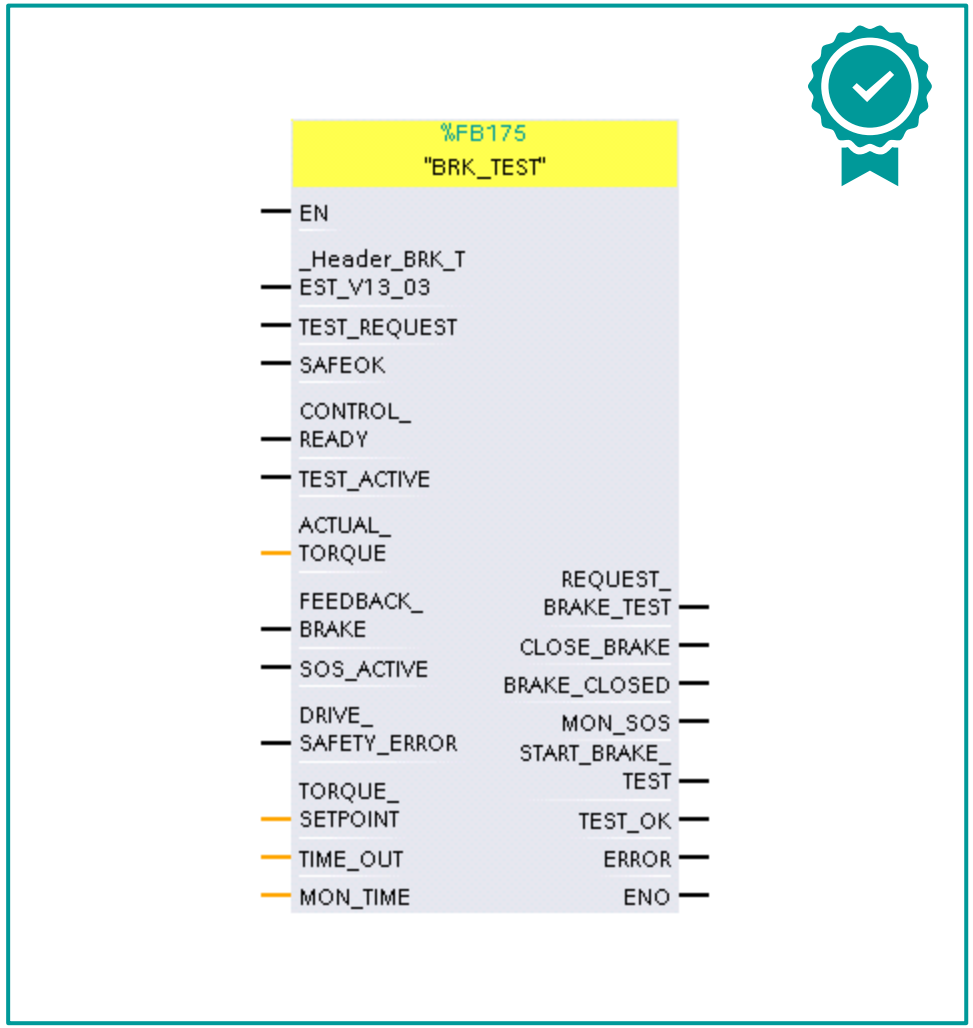



SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB175 „BRK_TEST“

## Brake test of a servopress

- Designed for servopresses (adapted for standard applications)
- Generation of request signal for brake test
- Is monitoring the torque against the brake in the given time
- Control of “Safe Operating Stop” (SOS) in the drive
- Control of the brake






SIEMENS

# Function blocks of the library SIMATIC S7-F/P
# FB176 „EN_SERVO“

## Safe setup mode and single stroke mode of a servo press

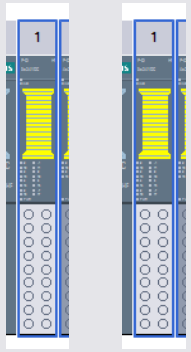
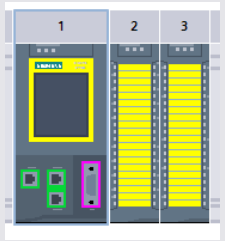
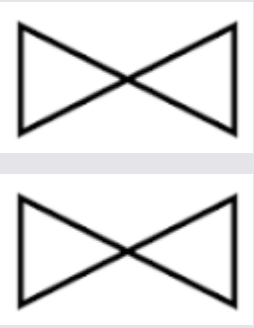
- Designed for servopresses (adapted for standard applications)
- Check of the selected operation mode
- Reaction to two-hand push buttons
- Reaction to handwheel enable button
- Reaction to current state of safety devices (light curtain, safety door, laser scanner, output cams)
- Control of safety integrated functions in the drive (SOS, SDI, SLS, SLS_limit)
- Brake control
- Delay times configurable




SIEMENS

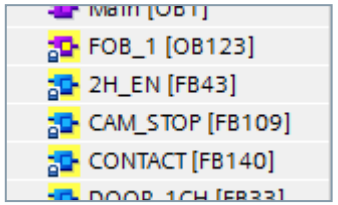
# SIMATIC S7-F/P
# Use Case: Two-Hand-Control with Emergency Stop

## How to reach SIL3/Ple with Two-Hand Control at a mechanical press?

| Two-Hand-Control incl. Emergency Stop | Capture | Evaluate | React | Press Safety valve PSV |
|---|---|---|---|---|
|  |  |  |  |  |

2-channel I 12.0

2-channel I12.1




Q 24.0 2-channel



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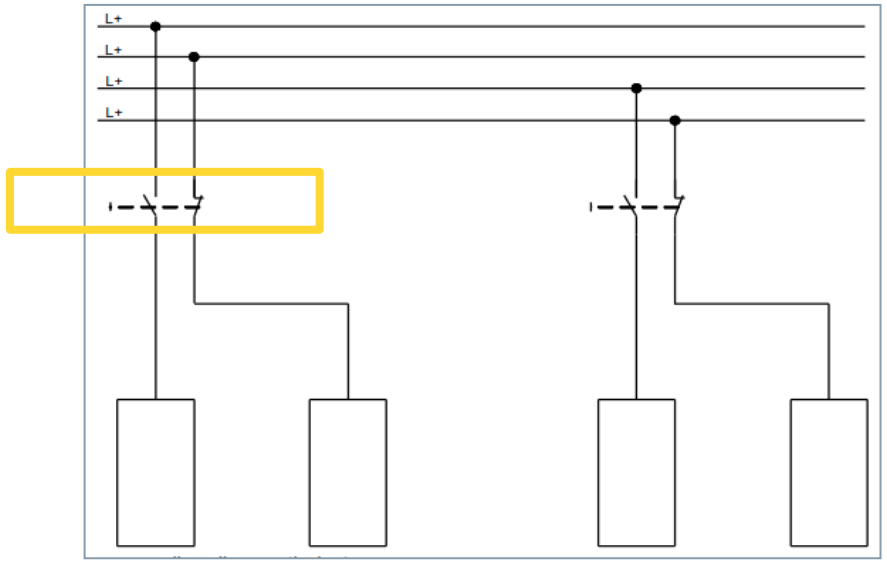
# SIMATIC S7-F/P
# Use Case: Two-Hand-Control with Emergency Stop

**Two-Hand-Control**

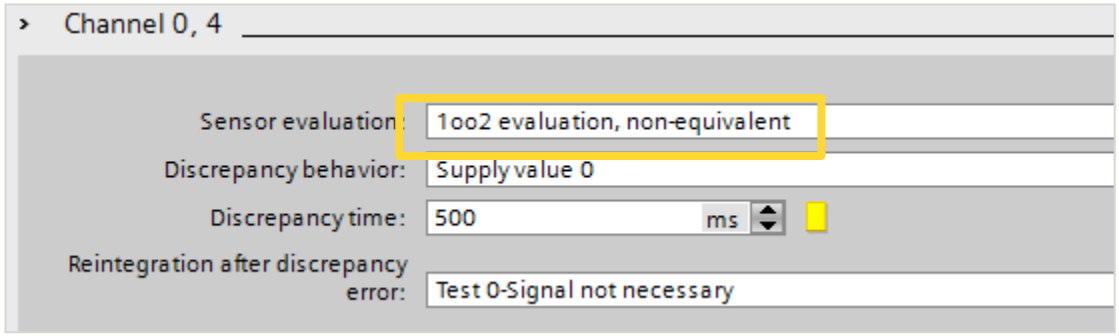
**Capture**


2-channel — I 12.0

2-channel — I12.1




| | Name | Type | Address | Tag table |
|---|---|---|---|---|
| | TwohandButton1 | Bool | %I12.0 | Default tag table |
| | TwohandButton2 | Bool | %I12.1 | Default tag table |




**Electrical**

**Tag Declaration**

**F-Module configuration**



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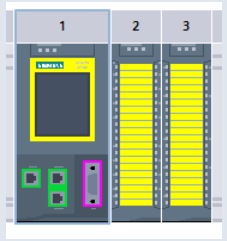
# SIMATIC S7-F/P
# Use Case: Two-Hand-Control with Emergency Stop

**Evaluate**




**Programming**

Control the press safety valve

Set the command to the operation mode selection

Evaluate and check two-hand signals

Main [OB1]
FOB_1 [OB123]
2H_EN [FB43]
CAM_STOP [FB109]
CONTACT [FB140]
DOOR_1CH [FB33]

**Network 6:** 2-hand monitoring

twohand not pluggable

#"2H_EN"
"2H_EN"
EN
_HEADER_2H_EN_V15_03 : false
ENABLE : true
"TwohandButton1" * IN1
"TwohandButton2" * IN2
Q → #TWOHAND
ENO

**Network 17:** Enable OPM1 (singlestroke twohand)

- inching until start transfer...

#EN_1_MAN_SINGLESTR_2H
"EN_1_MAN"
EN
_Header_EN_1_MAN_V15_06 : false
#OPM1ACT : OPMx
CONTOPM : false
STRTCOND1 : true
"StartCondition" : STRTCOND2
IMSTOP : false
TDCSTOP : false
#SAFE_MOVE : SAFEMOVE
#SAFE_MOVE : TRANSFER
#PSVACT : PSVACT
#TWOHAND : CMDDEVx
#GREEN : SAFE1
#OPMOFFOK : PASSAFE1
#Q_DOOR : SAFE5
SAFE6 : true
SAFE7 : true
SAFE8 : true
#C_TDCSTOP : C_TDCSTOP
STRT → #STRT_SINGLESTR_2H
SAFEOK → ...
ENO

**Network 25:** valve control for mechanical presses

Comment

#VALVE_ME_Instance
"VALVE_ME"
EN
_Header_VALV_ME_V15_05 : false
#CFAULT : CFAULT
#NOEMOFF : E_STOP
#STRT_SETUP : STRTOPM0
#STRT_SINGLESTR_2H : STRTOPM1
#STRT_CONT_2H : STRTOPM2
#STRT_SINGLESTR_FOOT : STRTOPM3
#STRT_CONT_FOOT : STRTOPM4
#STRT_SINGLESTR_LCU : STRTOPM5
STRTOPM6 : false
#STRT_BACKWARDS : STRTOPM7
#PSV1 : PSV1
#PSV2 : PSV2
#C_IMSTOP1 : C_IMSTOP1
#C_IMSTOP2 : C_IMSTOP2
PSVACT → #PSVACT
ENO



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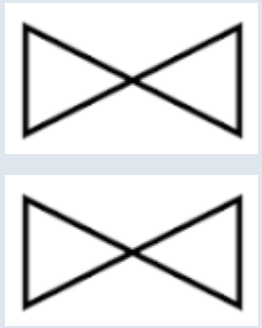
# SIMATIC S7-F/P
# Use Case: Two-Hand-Control with Emergency Stop

**React**

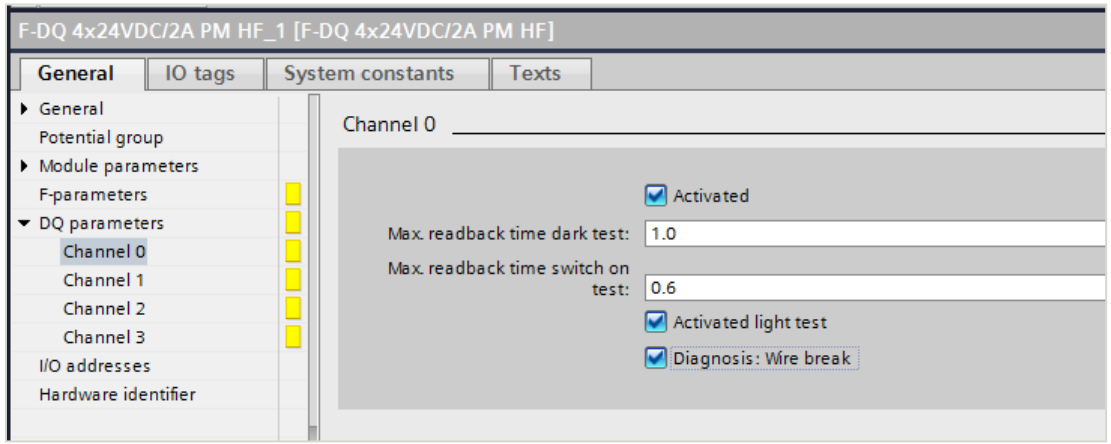
**Press Safety valve PSV**



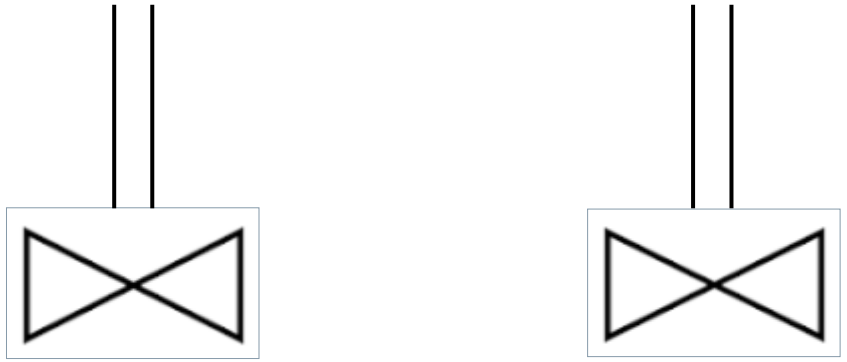
Q 24.0 ——— 2-channel

| | | | | |
|---|---|---|---|---|
| | PressSafetyValve1 | Bool | %Q24.1 | Default tag table |
| | PressSafetyValve2 | Bool | %Q24.2 | Default tag table |

**Tag Declaration**




**F-Module configuration**



**Electrical**



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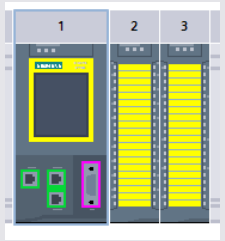
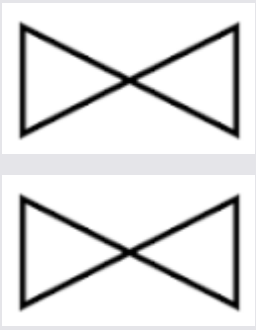
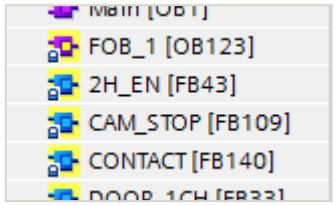
# SIMATIC S7-F/P
## Use Case: Two-Hand control and reaction

### How to reach SIL3/Ple with Emergency Stop at a mechanical press?

| Emergency Stop | Capture | Evaluate | React | Press Safety valve PSV |
|---|---|---|---|---|
|  |  |  |  |  |

2-channel — I 1.0 — Q 2x.0 — 2-channel



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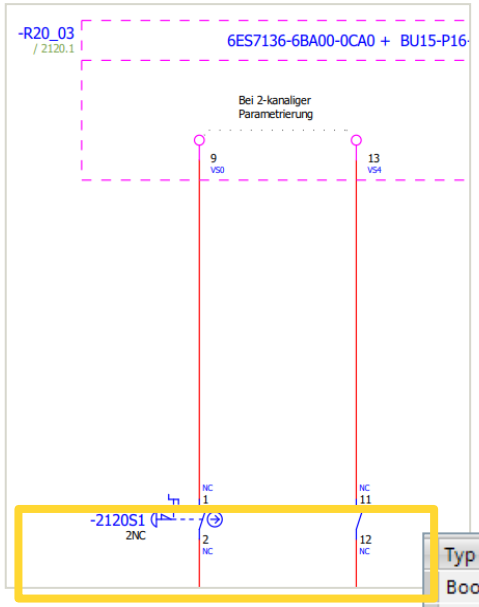
# SIMATIC S7-F/P
# Use Case: Two-Hand control and reaction

**Emergency stop**

**Capture**


**Electrical**

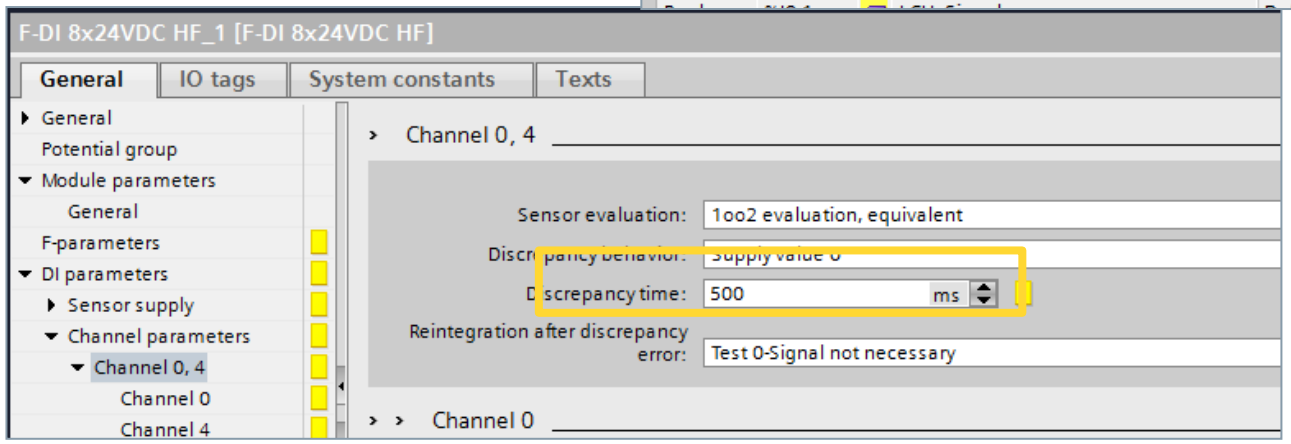



**Tag Declaration**

| Typ | Adresse | Name | Variablentabelle |
|---|---|---|---|
| Bool | %I0.0 | EmergencyStop | Default tag table |

2-channel ——— I 1.0

**F-Module configuration**



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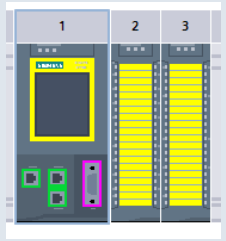
# SIMATIC S7-F/P
# Use Case: Two-Hand control and reaction

**Evaluate**

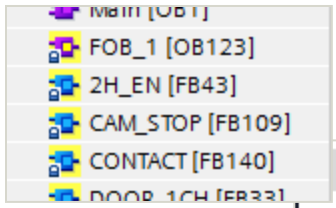


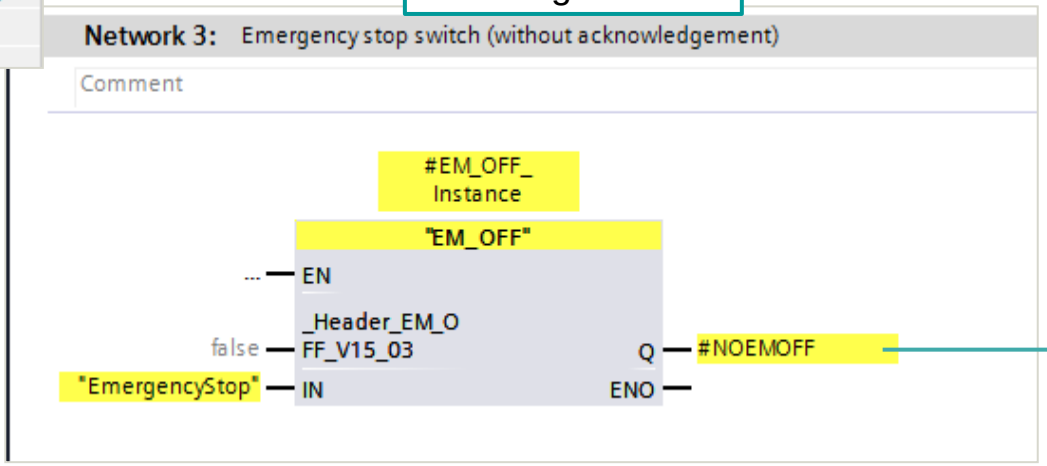

**Programming**

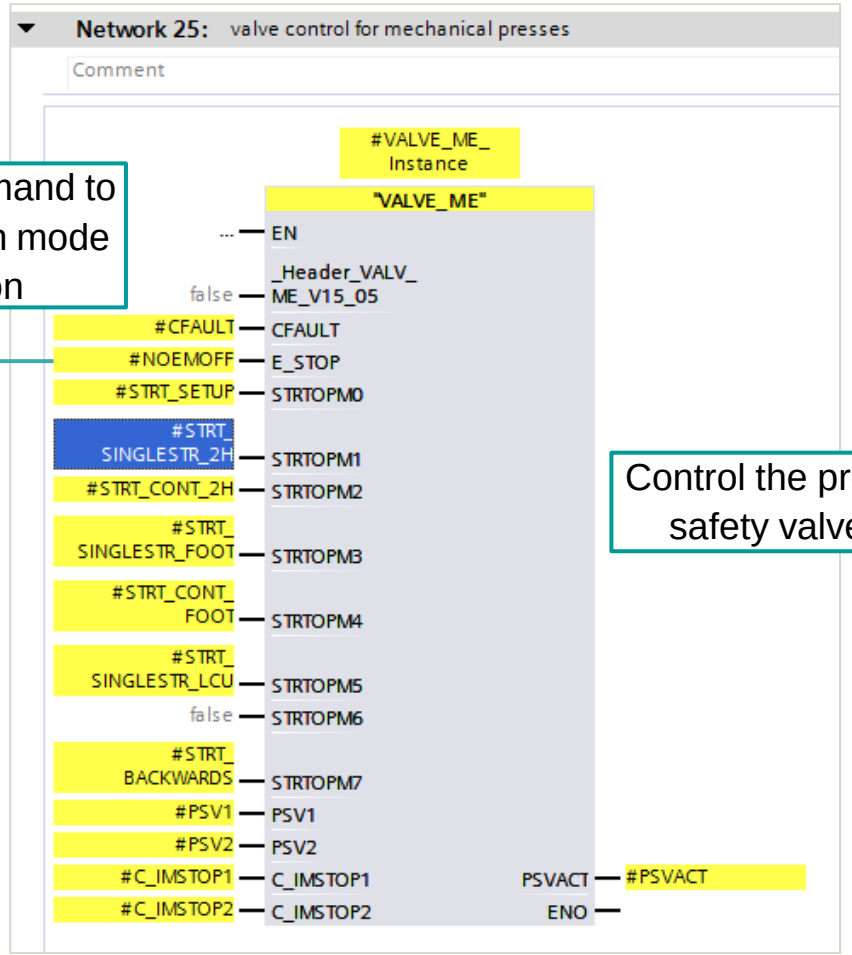
Set the command to the operation mode selection

Evaluate and check emergency stop signal

Control the press safety valve



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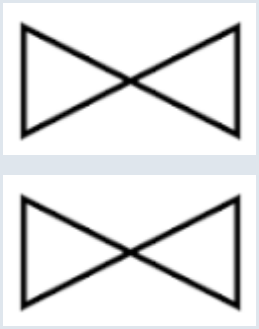
# SIMATIC S7-F/P
# Use Case: Two-Hand control and reaction

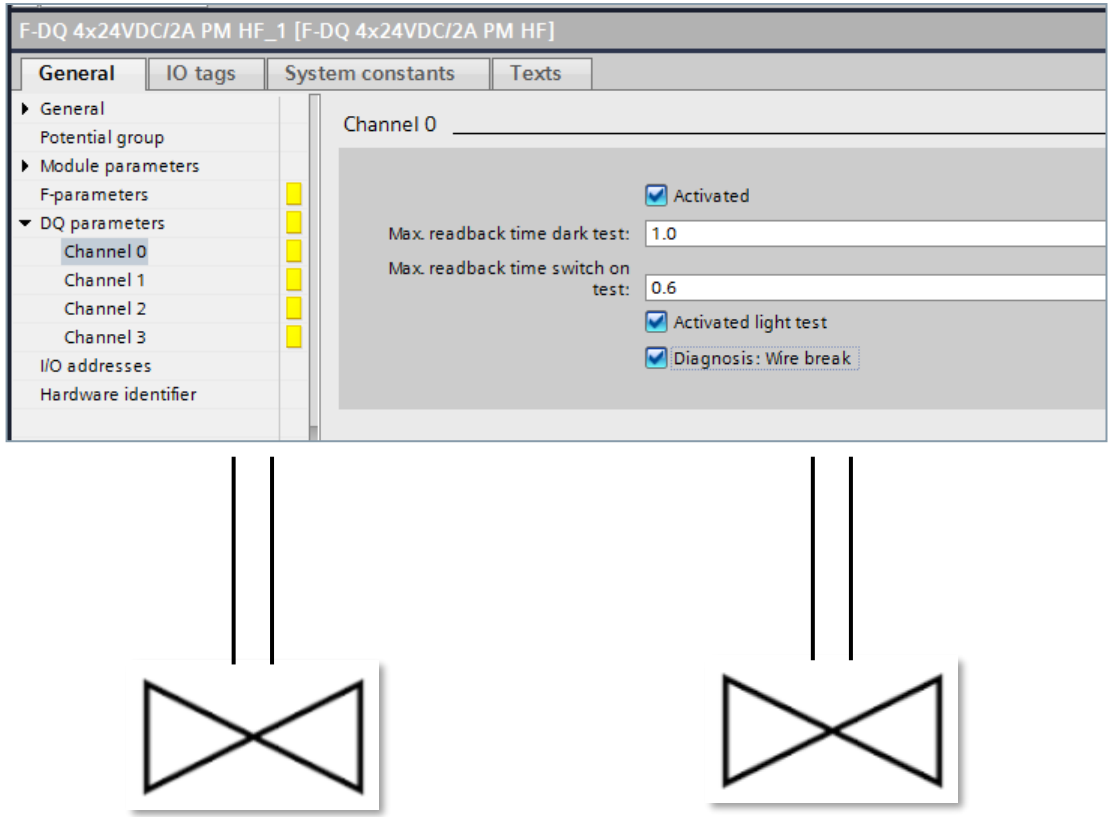
**React**

**Press Safety valve PSV**



Q 24.0 ——— 2-channel

| | | | | |
|---|---|---|---|---|
| | PressSafetyValve1 | Bool | %Q24.1 | Default tag table |
| | PressSafetyValve2 | Bool | %Q24.2 | Default tag table |




**Electrical**

**Tag Declaration**

**F-Module configuration**



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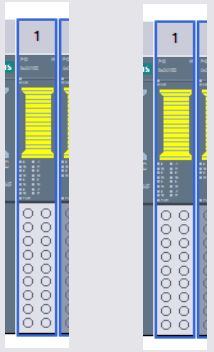
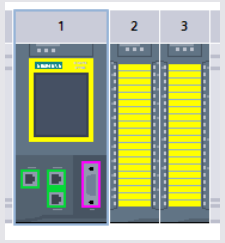
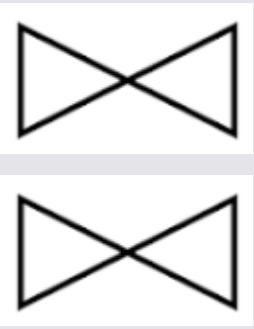
# SIMATIC S7-F/P
# Use Case: Two-Hand-Control with Emergency Stop

## How to reach SIL3/Ple with Two-Hand Control at a mechanical press?

| Two-Hand-Control incl. Emergency Stop | Capture | Evaluate | React | Press Safety valve PSV |
|---|---|---|---|---|
|  |  |  |  |  |

Certified according SIL3/Ple

- 2-channel wired to F-DI (Module certified SIL3/Ple)
  - Safety blocks from Press Safety Library (PLC and F-block certified SIL3/Ple)
- 2-channel wired F-DQ (Module certified SIL3/Ple)



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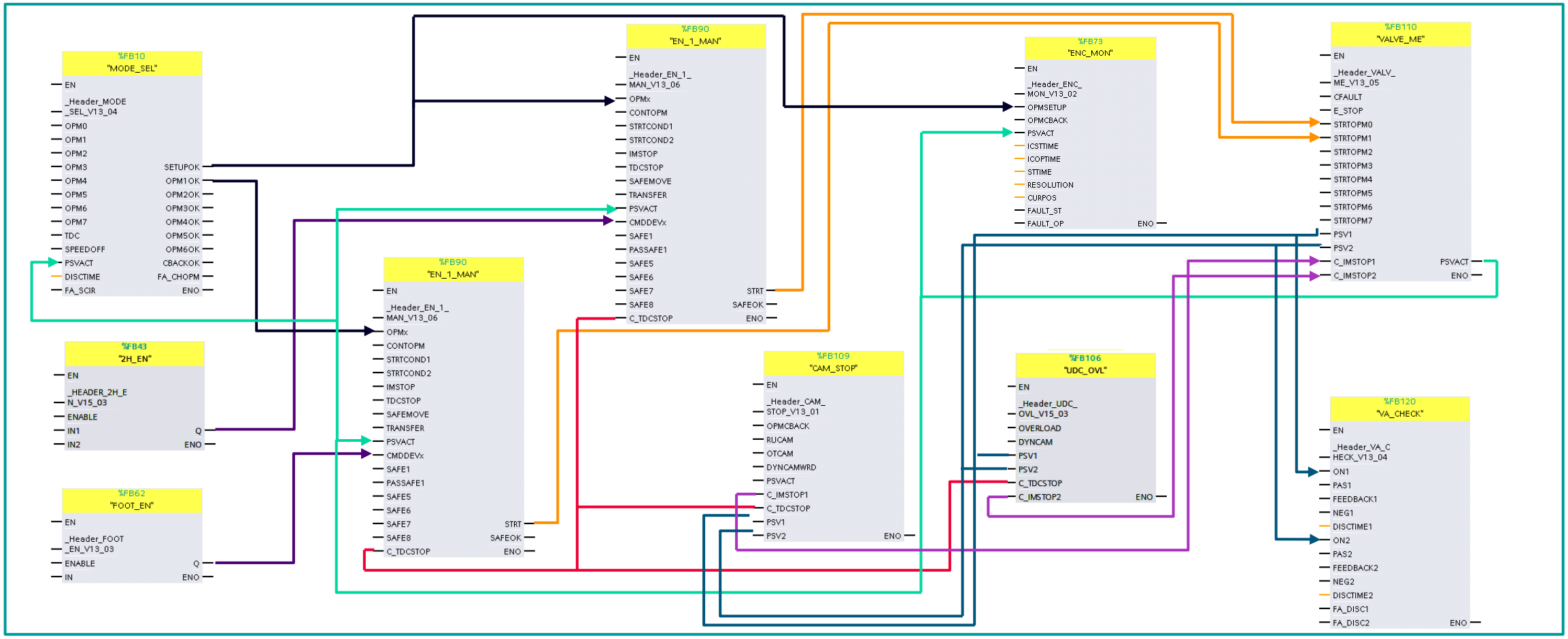
# SIMATIC S7-F/P
# Typical application conventional mechanical press

## Schematic user code and signal exchange of a mechanical press



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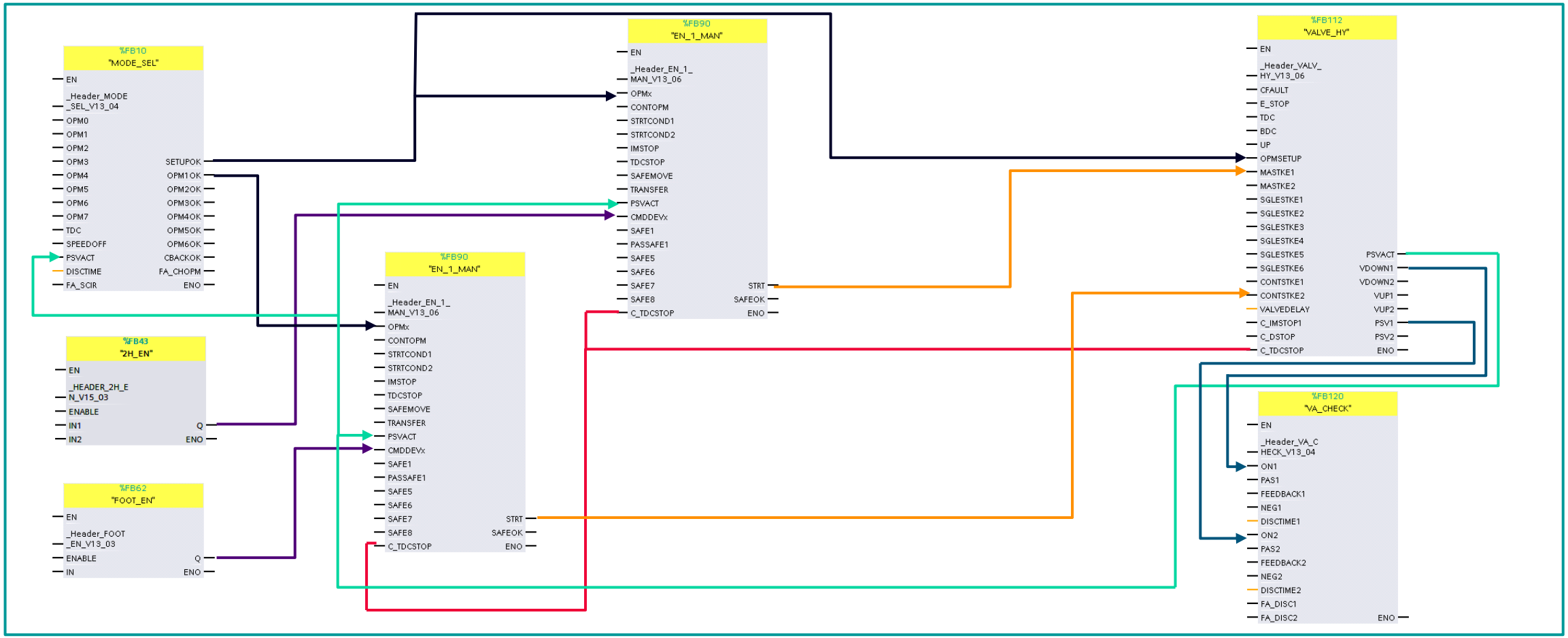
# SIMATIC S7-F/P
# Typical application hydraulic press

## Schematic user code and signal exchange of a hydraulic press



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